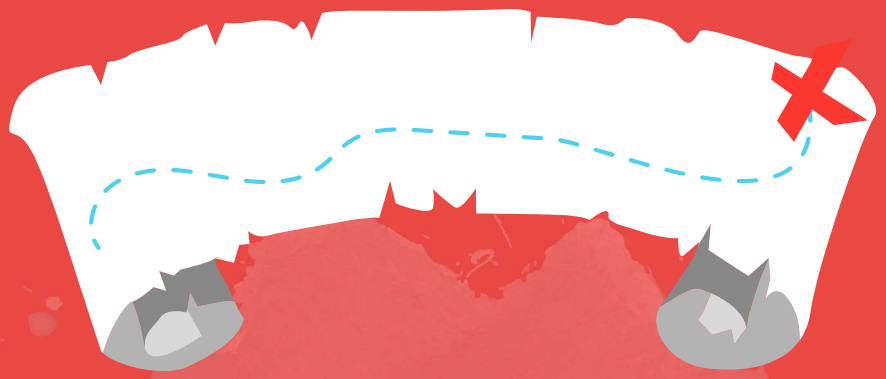

The Magical Book of Gamification

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Execution

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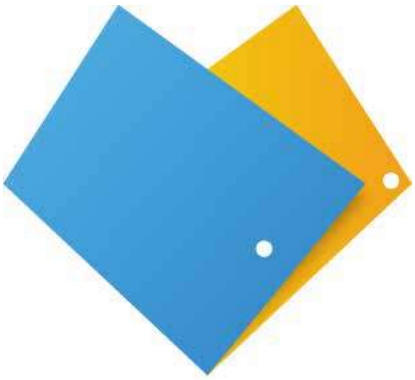

MESTRADO PROFISSIONAL EM
INFORMÁTICA NA EDUCAÇÃO

INSTITUTO FEDERAL
Rio Grande do Sul

Foreword

In recent years, many investigations have been conducted to analyze the applicability of games and their concepts in the educational area. Similarly, gamification, which includes the use of game mechanics and dynamics in non-game situations, has also been extensively researched in the context of education. Several studies (NETO; SILVA; BITTENCOURT, 2015; GONÇALVES, 2016; BRITO; MADEIRA, 2017; CUNHA et al., 2017; SILVA, 2017; CONEJO; GASPARINI and HOUNSELL, 2019; LOPES, et al., 2019; MOMBACH; SOUZA; ROSSI, 2019; SILVA; RODRIGUEZ; ROCHA, 2019) have pointed out that gamification can be adopted in the classroom, although some teachers believe that this learning strategy would require the application of several Information and Communication Technologies, and that the public school environment would not be ideal for this.

In this sense, this book aims to playfully bring the concepts of gamification and suggest a set of steps, properly systematized, that can guide teachers in the organization process of this pedagogical strategy. Thus, it is intended to allow education professionals to apply it, using both technological resources as well as unplugged environments.

Thanks to its elements, gamification offers multiple advantages in the educational context, because it allows teachers to motivate and engage students in their learning process. In addition, it can be used as an instrument to encourage the development of skills and competences, as foreseen by the National Common Curricular Base (BRASIL, 2017) and the Legal Guidelines for National Education (BRAZIL, 1996).

Through the dynamics and behaviors of gamification, it is possible to encourage the skills and competences needed in the 21st century. In this context, Tarouco (2013) argues that it is necessary to observe three categories: "Domain of central themes", "Learning and innovation skills" and "Skill with information, media and technology." In the context of gamification as a learning strategy, the essential point is related to learning itself, where:

> "Learning and innovation skills are increas ingly recognized as those that will distinguish students who are prepared for an increasingly complex life and work environment in the 21st century from those who are not prepared. The emphasis on creativity, critical thinking and collaboration is essential for students to act in a competent manner. The ability to think creatively, work creatively with others, implement innovations to solve problems effectively, and use a systemic approach to analyze and evaluate evidence, arguments, points of view, and beliefs to make decisions are some of the skills that can be developed. With regard to communication and collaboration, the ability to articulate ideas, to effectively use oral, written, and non-verbal communication in different contexts, and using various types of media and technology, as well as the ability to listen effectively, and decipher meanings (knowledge, values, attitudes, and intentions)." (p. 299)

In addition to the aforementioned aspects, considering the perspective of professional and technical education, in the

National Catalog of Technical Courses (MEC, 2016), many of the professional skills expected from graduates of these courses can be improved by using gamification.

This book is organized in eight chapters that establish an analogy with game levels, which are used to symbolize the progress within the gamification. They can be used as a "marker", indicating to players where they are in the gaming experience (ZICHERMANN; CUNNINGHAM, 2011).

The chapter "Before the Journey" presents storytelling, which is going to guide the reader, introduces the selected gamification model, and discusses the central structure of the gamified system, that is, the PBL Triad (points, badges and leaderboards).

On Level 1 some gamification definitions are exposed and how they relate to the concepts of games and play. At this level, the PLEA model - Task Planning, Execution and Assessment (ROSÁRIO, 2004a) is also introduced, and some considerations are made regarding the importance of self-regulation of learning. Finally, there is the description of the four created cards (elements, mechanics, dynamics and behaviors), that allow designing and systematizing a gamified experience.

Level 2 deals with the concept of element, also bringing the classic elements of gamification through cards of traditional elements. Next, some examples of mechanics are described on Level 3, aiming to introduce a more playful approach to the planning process of this strategy.

Level 4 sets out some of the dynamics that can be used in a gamified strategy. In fact, this particular book prioritizes dynamics, making it possible to explore the 21st century skills needed by students at various education levels. Level 5, in turn, addresses the desired behaviors, three of which were prioritized for the context of this book: empathy, self-efficacy and time management.

Level 6 describes one of the ways to apply PLEA in the planning of a gamified strategy, observing three essential points - planning, execution and monitoring -, and assessment. Level 7 is structured in such a way as to make it possible to apply all the items defined in the previous levels, thus composing a gamified strategy in practice.

Level 8 presents a final reflection on gamification and its application in the educational environment, and lists the research that gave rise to this book.

Finally, we hope that this book can make a contribution so that teachers can understand the distinction between a game and gamification, whose systematization can transform the classroom space, enhancing the development of skills and competences related to the 21st century.

The authors would like to thank **Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Sul (IFRS)** for the financial support granted for the publication of this book, through Public Notice IFRS 36/2020.

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Before the journey

Before we start our journey, we thought about telling you a little bit of what is to come and give you some suggestions on how you can use this book. This educational book, approved by the magic laws in force in our country, is intended for non-wizards who are new to the Ancestral Art of Gamification, one of the mandatory subjects in the Teaching Training Schools for Witches and First Order Magicians. According to the Ministry of Magic of Brazil, the use of the enchantments available in this book must be carried out by teachers and other professionals interested in motivating, engaging, and encouraging student behaviors through the elements and thoughts of the games.

This book was written using a sequential structure inspired on storytelling, in a gamification system based on the use of the MDA model (Mechanics, Dynamics and Aesthetics) to report the creation of a practical gamification project, using the Triad PBL (points, badges and leaderboards) as the central structure in the gamified system (KAPP, 2012; KAPP; BLAIR; MESCH, 2014; ZICHERMANN; CUNNINGHAM, 2011).

As it should be, this book was also enchanted with the magic of gamification, which seeks to help novice and experienced teachers to plan gamified learning experiences. If you are a beginner, we suggest that you follow the structure sequence the book suggests, as each stage of your journey will raise your level of knowledge regarding the planning, execution and assessment of gamified educational activities. According to one of the greatest magicians of all time in Game Design, Jesse Schell (2015), there is no universally accepted classification for the various characteristics present in games; however, even in a simple game, the mechanics and dynamics have their own characteristics that start from an intent. There is no magic without intent. Thus, in our view, gamification cannot exist without students who intend to actively participate in their learning process, or without the teachers' intent to use it pedagogically, where they must also seek to self-regulate their behaviors and remain engaged in the success of the project.

1- PBL: Points, Badges and Leaderboard, which are the three most used and recognized elements in gamified systems.

The Gamification Journey

The concept of gamification was first defined by researchers Deterding, Dixon, Khaled and Nacke (2011) in the article "From Game Design Elements to Gamefulness: Defining 'Gamification'". For the authors, gamification refers to the use of design, elements, and characteristics of games in contexts not related to games, regardless of specific intentions in the use, the situation, or the means of implementation. Gamification uses game thinking and mechanics to engage users and solve problems (ZICHERMANN; CUNNINGHAM, 2011) and, when used properly, ithas the power to engage, inform, and educate (KAPP, 2012).

To define the game, we are going to use the concepts brought by Huizinga (2007), where he points out that the game is a voluntary, temporary activity and it has its own orientation. In the game´s circle (also known as the magic circle), the laws and customs of everyday life are no longer valid. In it, we are different and we do different things, and error belongs to the game, which can be repeated at any time. "Every game has its rules. They are what determine what 'counts' within the temporary world it circumscribes. The rules of all games are absolute and do not allow for discussion" (HUIZINGA, 2007, p. 14). In other words, a game without rules or objectives is just playing.

Deterding et al (2011) classified gamification, positioning it between two axes (figure 1). The horizontal axis is the extent to which a game is complete (the game itself, formed by its parts) including the elements that are part of it, and the vertical axis, which differentiates between play (free and relaxed) and the defined game (formal). Thus, gamification presupposes the use of game elements, without the end result being a complete game (FARDO, 2013a, 2013b), where playfulness does not overlap with the fundamental concepts of games, such as established rules and objectives, which are consciously and voluntarily accepted by the participants. Likewise, despite the different views on how to classify and choose the elements that make up an activity using gamification, and the very use of the approach, it should not overlap your intention in relation to the learning objectives. It is the intent of a teacher, or an instructional and learning designer, that allows the elements to be transformed into mechanics, dynamics and behaviors.

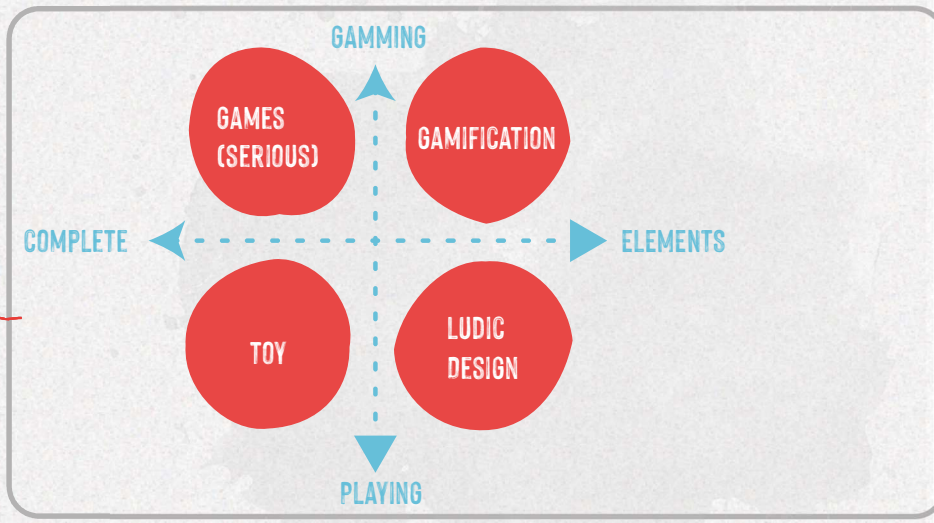


Figure 1 - Positioning Gamification between axes.
Source: Adapted from Deterding *et al* (2011).

Collaborating in this sense, Zichermann and Cunningham (2011) highlight that another aspect to understand the motivations of the gamers includes questioning where they come from. According to these authors, in general, motivation is divided by psychology into two groups: intrinsic and extrinsic. Intrinsic motivations are those that derive from our main self and are not necessarily based on the world around us. These are intimate wishes and desires that represent value or personal satisfaction in the task because they are aligned with personal goals. On the other hand, extrinsic motivations are fueled, mainly, by the world around us, as the desire to gain something not directly related to the activity or action itself. They consist of values outside of the individual, which can be used as intermediate steps necessary to achieve intimate desires or personal satisfaction not found in a task. It is possible to add elements of extrinsic motivation for an individual to perform tasks or to achieve intermediate goals that bring them closer to their personal goals.

According to Kapp (2012, 2013), gamification can be divided into two categories: structural and content. Gamification of structural type occurs when game elements are used to propel students through content without alteration. But content gamification takes place when the application of elements, mechanics, and game thinking serves to change the content, and thus make it more similar to a game. In this sense, structural gamification is mainly concerned with how the student will interact with the content, while the gamification of content acts directly on the different types of content and concepts (ALVES, 2015).

It is worth remembering that gamification refers to the use of design, elements and characteristics of games in contexts not related to games (DETERDING et al, 2011). So, to create experiences using this approach, you do not have to be a big gamer. However, the more knowledge you have about the structure of the games, the greater the set of elements, mechanics, dynamics, and behaviors that will be part of your magic toolbox. After understanding their operations, the elements of games can contribute to the learning process, in a planning process designed for " the experience of the one who learns and in what this person needs to do with this learning" (ALVES, 2016, p. 30), in order to facilitate and accommodate students' needs in relation to their learning objectives.

Imagine that a schoolgirl has the dream of being an astronaut and travelling to other planets (intrinsic motivation). Although motivated to study about stars and planets, the same does not happen when it comes to studying other content in which she is unable to visualize the direct relationship to her dream. So, she receives a proposal that, for each approval in contents in which she does not feel motivated, she is going to be rewarded with a visit to a planetarium or museum of her choice. This gives her an extrinsic motivation, which may help her achieve her dream.

LEVEL 1-1 THE STARTING POINT

An information society increasingly requires students to play a role with leadership and autonomy, because more important than "consuming" information is knowing how to search for it, select and decide what is essential for learning (ROSÁRIO et al. 2000). In this context, we understand gamification as a tool that not only can motivate and engage, but can bring other important benefits to pedagogical practices conducted in the classroom, such as self-regulation of learning.

Self-regulation of learning is an intentional process where students use strategies to plan, monitor and evaluate their actions aiming at their own learning (ROSÁRIO, 2004a, 2004b; FRISON, 2016), through a cyclical process, didactically demarcated by three phases: starting with planning the activities, continuing with the execution, and ending with self-reflection (FRISON, 2016). As a result, self-regulated students have behaviors that favor the quality of learning and strengthen personal beliefs of self-efficacy, as well as managing their emotions and motivations (GANDA, 2018). According to Rosário (2004b), students need to know a greater number of self-regulatory learning strategies, to know how different situations and concrete learning tasks are applied, but also when to apply each one. Therefore, it is essential to adopt a tool that allows the organizational process of planning, execution and assessment of learning activities.

Therefore, for continuous planning and refinement in the use of autonomous gamification strategies, we are going to use the PLEA tool. The PLEA, as the acronym indicates, consists of a model and tool proposed by Rosário (2004a) for the PLanning, Execution and Assessment of tasks. This model was based on the strategies for self-regulated learning identified by researchers Zimmerman and Martinez-Pons (1986) through self-reports by students in their most common learning contexts: the classroom and individual study. By strategy for self-regulated learning, we mean actions aimed at acquiring information or skills that involve a purpose and the student's self-perception of the ability to intentionally intervene in their environment (ZIMMERMAN; MARTINEZ-PONS, 1986). Table 1 describes each of the 15 strategies numbered by Zimmerman and Matinez-Ponz (1986) and organized according to the stages of PLEA.

PHASE	LEARNING STRATEGY
PLANNING PHASE	1.Self-assessment (...) students assessments regarding the quality or progress of their work
	3. Goal settings and planning (...) planning, time phasing, and completion of activities related to these objectives
	6. Environmental Structure (...) efforts to select or alter the physical or psychological environment in order to promote learning
	9-11. Search for social help (...) the initiatives and efforts of students to seek help from their peers (9) , teachers (10), or other adults (11)
EXECUTION PHASE	2. Organization and transformation (...) students initiatives to reorganize, improving the learning materials
	4. Search for information (...) the efforts of students to acquire extra information from non-social sources when facing an academic task
	5. Note taking (...) efforts to record events or results
	8. Repetition and memorization (...) the initiatives and the efforts of students to memorize the material
	15. Other (...) the statements indicating learning behavior initiated by other people and all of the verbal responses with minimal clarity. Subdivided into undecipherable answers (15.1), "reactive" affirmations (15.2) and affirmations of "willpower" (15.3)
ASSESSMENT PHASE	7. Self-consequences (...) the imagination of realization of rewards or punishments for academic successes or failures
	12-14. Data review (...) The students' efforts-initiatives to reread notes (12), exams (13), textbooks (14), in order to prepare for a class or a written exercise.

Table 1- Learning strategies detailed in relation to the phases of self-regulation of learning
Source: Adapted from Rosário (2001, 2004a).

The self-regulation strategies identified by Zimmerman and Martinez-Pons (1986) were classified by Rosário (2004a) according to the phases of Planning, Execution and Assessment of the tasks developed that form the PLEA, ensuring a cyclical and continuous movement that relates them, as illustrated in Figure 2. Simultaneously, the process is activated in each of the phases, reinforcing the model's self-regulatory procedural logic.

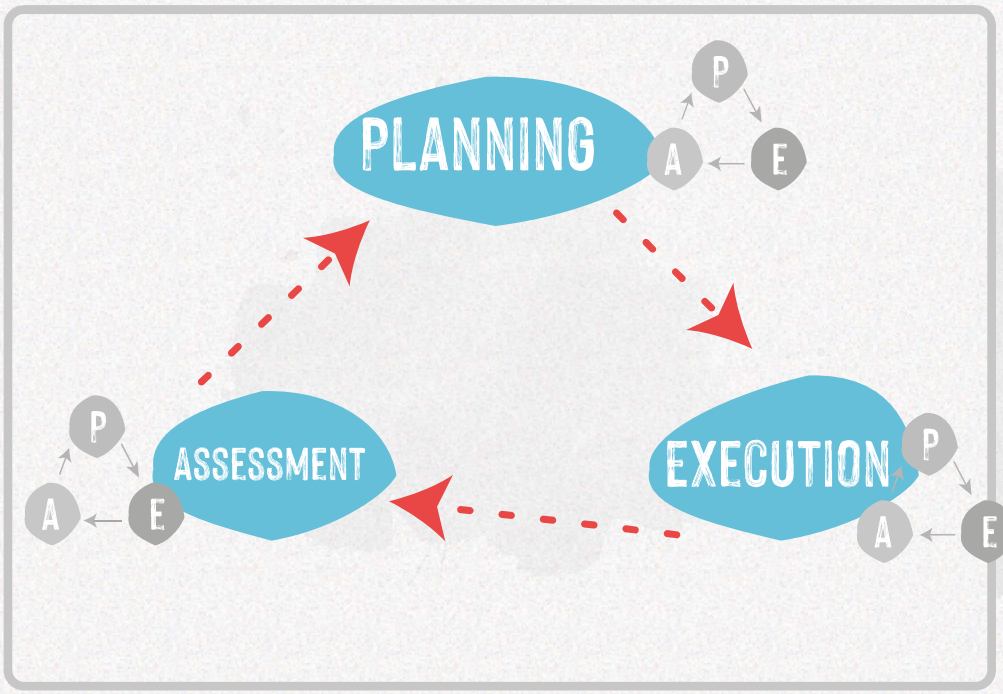


Figure 2 - PLEA Phases
Source: Adapted from Rosário (2004a).

PLEA emerges as a tool that makes it possible to work and identify self-regulation strategies for learning. The model represented in Figure 2 has been revised and adapted by the authors in order to include it as a tool for planning, executing/monitoring and evaluating the gamification project, and will be analyzed at LEVEL 6 - THE GAME´S SYSTEM.

LEVEL CHALLENGE: CREATING AN ACTIVITY

The production of materials and the planning of learning activities remains a major challenge for teachers. In this sense, to create a more playful environment, it is common to use or adapt game structures to introduce content to students, which is not, in itself, considered gamification. Understanding how the mechanics, dynamics, and behaviors of the elements interact helps to understand how these strategies can be applied to favor the learning process and, in many cases, add a little fun.

A good example of this is the Memory Game. According to the Prudente de Moraes Historical and Educational Museum, the Memory Game was created in China in the 15th century and consisted of a deck of illustrated and duplicated cards, with the following rules:

- Each figure is repeated in two different pieces;
- To start the game, the pieces are placed with the figures facing down,
- so that they cannot be seen;
- The game ends when the last pair is collected.
- The winner is the participant with the most pairs at the end of the game.

In their academic use, these illustrations are replaced by content, forming various types of pairs: graphics, images, and complementary texts made available virtually or as cards (pieces).

Consider the following scenario: *the teacher wants to create an activity where students can reinforce the main concepts and definitions presented during class about new content.*

Bearing in mind the beginning of our journey, we will are going to create a set of cards that will serve as a reinforcement activity for the recognition of concepts and definitions of the previously introduced Strategies for Self-Regulation of Learning Strategies. The structure presented in this challenge may be adapted at other levels, as well as to the reader's personal practices. An outline of a version for thethe Memory Game version with the concepts and definitions presented in Table 1 - Self-Regulation Strategies for Learning, adapted from Zimmerman and Martinez-Pons (1986), can be seen in Figure 3.

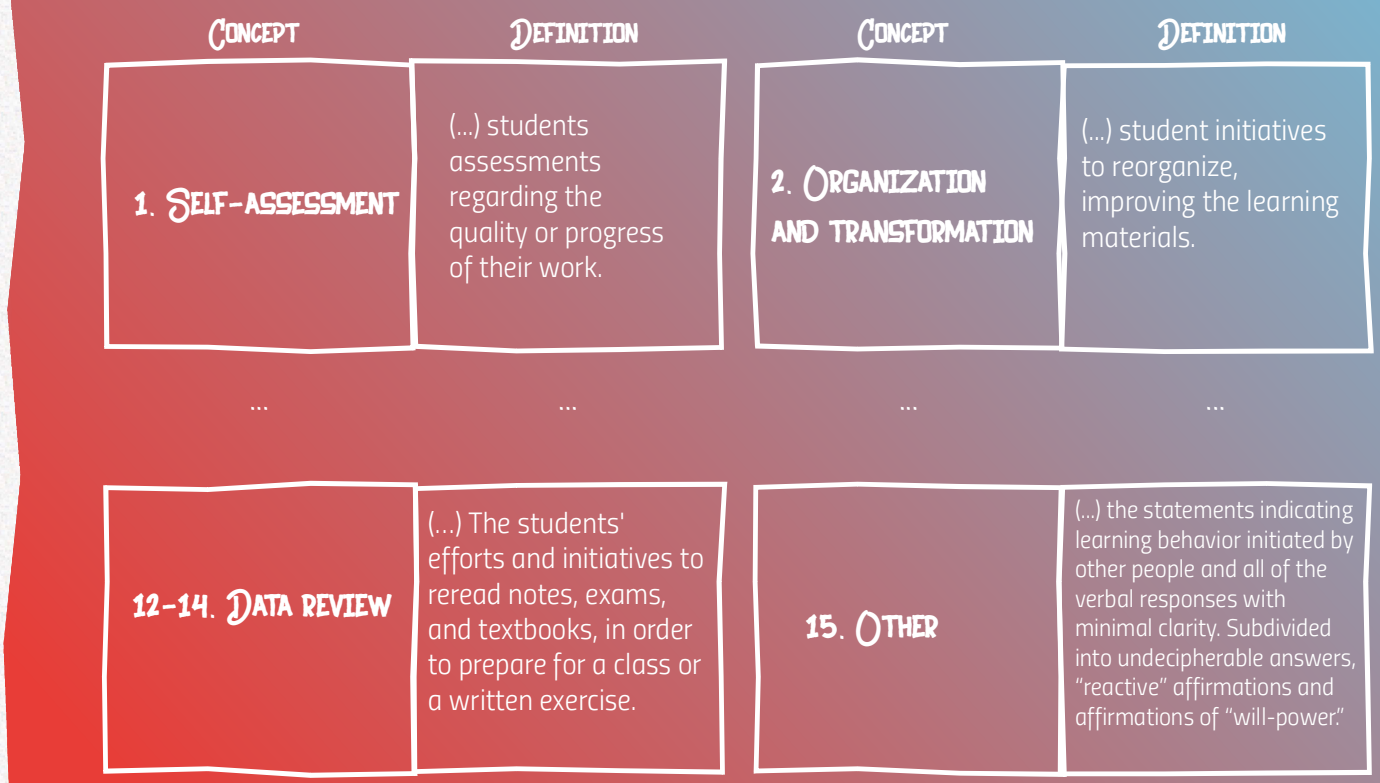


Figure 3 - Example of Memory Cards using Strategies for Self-Regulation of Learning
Source: Prepared by the authors, 2020.

For the card pairs not to be identified, the identification numbers of the concept definitions were removed "12-14. Data Review" and "15. Others", Figure 4, thus, the reader must know the relationship between the concept and the definition to know if the revealed pair is correct.

Now, think about how other popular games can collaborate and guide students in relation to the designed scenario and create an activity using the gamification concepts and definitions presented thus far. Some suggestions of games with similar potential and that have a structure that could be used: Tic Tac Toe, Puzzles, Checkers, Word Search, and Crossword Puzzles.

Use the table reserved below for the activity.

Figure 4 - Model for adapting games
Source: Prepared by the authors, 2020.

Concept	Definition
1-	
2-	
3-	
4-	
5-	

Game name:

How does the game work? (rules, objectives, what should be done to win)

What is the Learning Objective?

What did you learn about the structure of the game that could be used in an activity?

Describe your adaptation of the game structure to use in your activity:

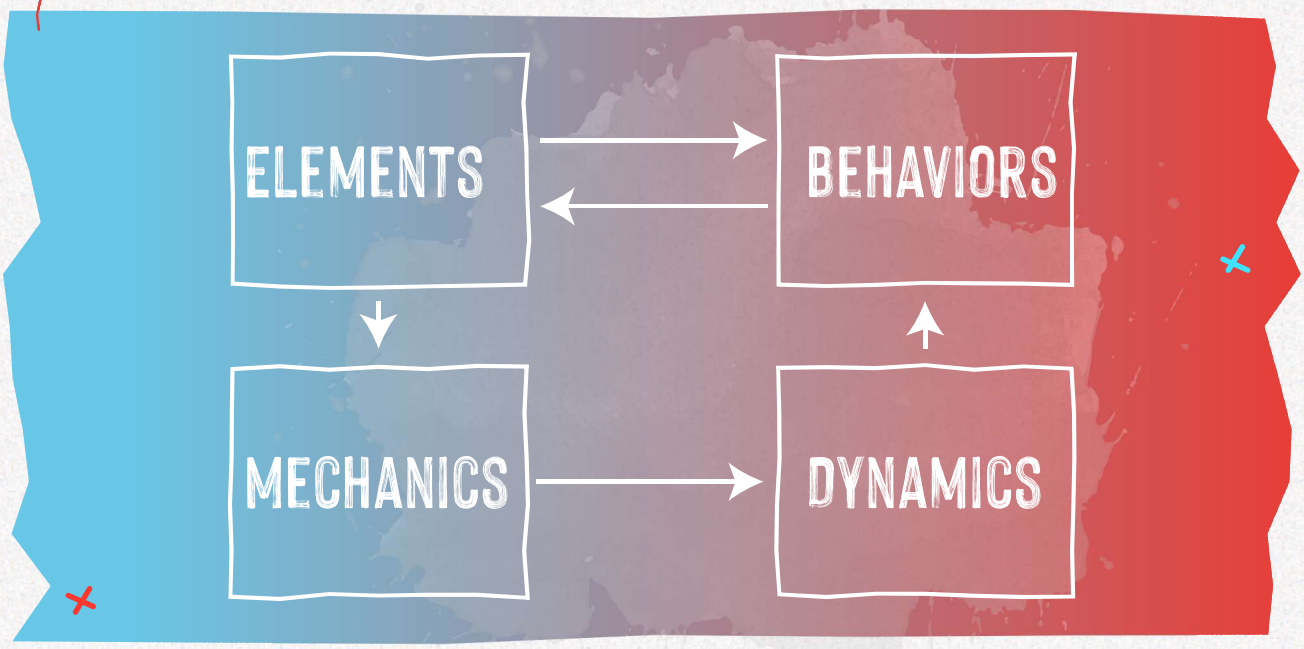
Hands-on! Create your activity using paper and pen or digitally.

LEVEL 1-2 POWER CARDS

During this journey in search of know ledge of gamification, you will find **Power Cards** that, when combined, can unleash great powers and possibilities. In gamification, game elements can be considered building blocks with special characteristics. They can be visual or symbolize something that does not exist in the real world, configuring themselves as rules, behaviors, and actions, in a set of intentions that are integrated into the game system. In search of a practical approach to the use of gamification in education, a set of instructions was prepared, organized into four categories of Power Cards (Figure 5): Elements, Mechanics, Dynamics and Behaviors.

We can see, in the scheme illustrated by Figure 5, that the elements are related to the mechanics, since they dictate the functional rules of a game. These, in turn, relate to the dynamics that aim to maintain the interaction of users with the mechanics of the game. The dynamics, related to the behaviors, seek to boost them or the emotional state of the participants. The elements still correlate to the behaviors, through the behavioral characteristics that already exist in the element. Since the same occurs in the opposite direction of the relationship, the behaviors, in turn, connect to the elements, creating a balancing opportunity for the adjustment of the game system, through the inclusion of a new element or the removal of an existing element.

Figure 5 - Relationship between the categories of Power Cards
Source: Prepared by the authors. 2020.

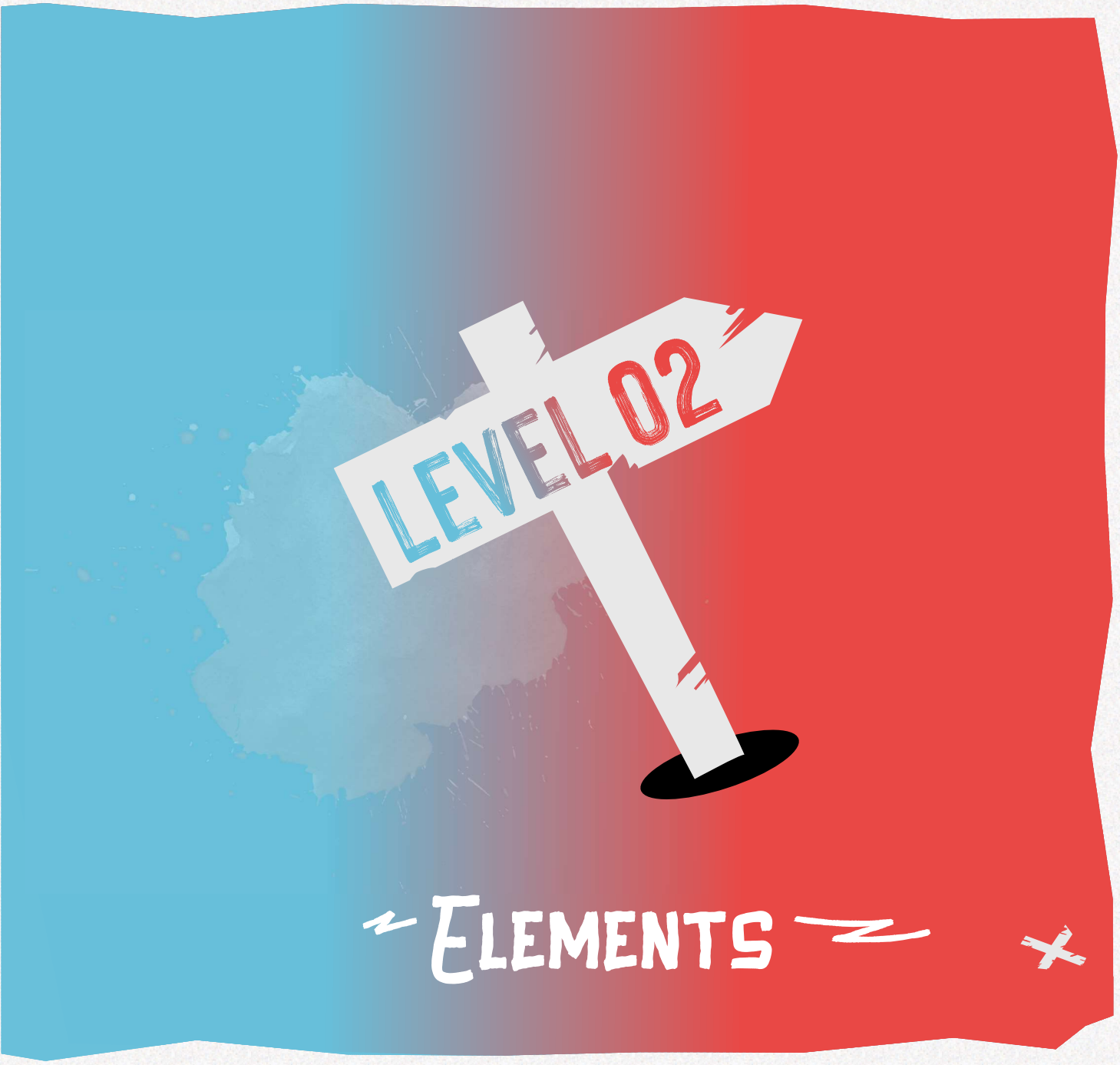


With this logic, the **Elements Cards** represent the basic and functional structure of a gamification element. They include the general concept, synonyms and variations, types and classifications, tips, warnings, and a general idea of how to use them in a gamified learning experience. This type of card may contain instructions on how to use Mechanics Cards to assist in the creation of rules that are linked to an element.

Mechanics Cards are the functional components of the game, that is, they bring the rules that allow students to guide their actions in the desired direction. They include, in addition to the general concept, items of mechanics, expected results, tips, warnings, and a general idea of how to use mechanics properly in their corresponding elements. Meanwhile, the mechanics may contain instructions on how to use the Dynamics Cards to assist in directing actions and intentions related to the creation of the mechanics.

Dynamics Cards understand the origin of the dynamic behavior of the gamification system. Dynamics cards, similarly to those previously mentioned, present the general concept, dynamic items, expected results, tips, warnings, and a general idea of how to use them in order to encourage students to interact with mechanics. This type of card may contain instructions on how to use Behavior Cards to assist in planning the desired behaviors during the dynamics.

The **Behavior Cards** correspond to the students' expected behavior or emotional state during a given dynamic, or even as general guidelines for the game system, and bring the general concept, characteristics, expected results, tips, warnings, and a general idea of how to encourage this behavior or emotional state in students. These cards can be used to choose or create Elements Cards that can help to even out and balance your gamification system.


LEVEL 02
ELEMENTS

Elements are building blocks. According to Deterding (2011), gamification elements should be identified as a set of building blocks or as resources shared by games to play a significant role in the gameplay and gamification experience. The elements can be modified, rearranged and used freely; in other words, they can be intentionally aggregated in the creation of a new element, in order to contribute to achieve the learning objectives contained in an activity, or learning unit, that seeks to purposely promote self-regulatory processes.

Below are the cards related to the elements selected to integrate this book. They include: points, levels, badges, leaderboards, storytelling and feedback. Note that there is a definition of a card called "Generic Element", which can be created by the teacher to introduce [any] other element that was not planned in the scope of this book.

POINTS

Synonyms and variations: coins, rings, strength, lives, score, XP, etc.

"Points are a measure of how to track behavior, maintain scores, and provide feedback."
Zichermann and Linder, 2013

XP - Experience: accompany the player's experience over time.
Redeemable: these are monetary points that you can earn and redeem.
Reputation: contribute to establishing trust between two or more parties.
Skill: these points denote your ability in a specific area.
Karma: they create a behavioral path and are generally not redeemable.

-They must be proportionate to their importance and significance for the learning objectives

-The methods for scoring tasks and activities should be explained in advance

-Try to assign the values using a grouped format

WARNING

- try not to remove points for mistakes: this can discourage students and decrease their motivation

HOW TO USE IT

1 - choose the type of point structure

2 - use scoring mechanics

3 - plan actions or events for the points

4 - give and receive student feedback

BADGES #1

'Badges serve several individual and social functions, depending on the nature of the activities and the context, and can serve as thanks, identification, achievements, and others." Churchill and Antin, 2011.

SYNONYMS AND VARIATIONS

medals, trophies, ribbons, tags, shields...

TYPES AND CLASSIFICATIONS

Goal Setting: challenges and motivates users to achieve the brand defined for them.
Instructional: guides and maintains its engagement in the objectives related to the community.
Reputation: can provide a summary of a member in a community or group.
Status and Affirmation: identify an user's achievements and state their accomplishments.
Group identification: increases the sense of solidarity and the identification with the group.

- they can serve a variety of individual and social functions
- the number of badges related to a task or activity must be proportional to its importance and meaning for learning
- the methods for the student to earn the badge must be explained in advance
- they can be used to certify the attainment of skills and competencies

WARNING

- overlap with levels
- lack of clear criteria for causing misinformation and disinterest
- do not create badges for negative events

HOW TO USE IT

1 - choose the type of badge structure
2 - use **BADGE MECHANICS**
3 - plan actions or events for the badges
4 - file the badges
5 - give and receive student feedback

LEVELS

'Levels are hierarchical structures of progress, usually represented in an upwards direction through numbers or values, and serve as a markers to let gamers players know where they are in an experience." Kapp, 2012; 2013

SYNONYMS AND VARIATIONS

phases, stages, classifications, difficulty, mode...

TYPES AND CLASSIFICATIONS

Game Levels: structure based on phases, stages or missions that involves gamers within a controlled progression order.
Gameplay Levels: based on the relationship between the player's experience and the degree of difficulty found in the game (easy, medium, difficult, ...)
Gamers Levels: a unit of measurement normally used to quantify a character's progression through the game.

- they can be useful to make an approximate explanation of how the progression system works
- they indicates what the students can expect to achieve if they continue to participate
- let the studentsm choose the level they want to join the game in or create a placement test
- they can be used as an access or restriction to activities and content
- they presented a way to categorize indicators

WARNING

- overlap with badges
- lack of clear criteria about their progression or need

HOW TO USE IT

1 - choose the type of level structure
2 - use **LEVEL MECHANICS**
3 - plan actions or events for the levels
4 - give and receive student feedback

FEEDBACK

'It is the main source of information available in a game. It constantly guides gamers progress, performance, corrections, and projections." Werbach and Hunter, 2012

SYNONYMS AND VARIATIONS

message, warning, alert...

TYPES AND CLASSIFICATIONS

Conformational: degree of correction or error in a response, action or activity
Corrective: instructional result towards the correct result, without providing the answer
Explanatory: corrective result explaining to the student the result and providing the correct answer
Diagnosis: diagnose the misconceptions, reasons and incorrect concepts demonstrated by the student
Natural: it is when the student receives the same type of feedback that he would receive in the real world
Artificial: receives feedback information in a format that does not occur in the real world
Juicy: effective, exciting and engaging feedback.

- It must be informed as soon as possible
- think about student preferences regarding the means, format and periodicity of feedbacks.
- write short, positive, easy-to-understand feedback

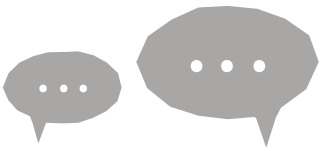
WARNING

- experiences without feedback are frustrating and confusing
- do not send feedback outside the context linked to the learning objectives

HOW TO USE IT

1 - choose the type of feedback structure
2 - use **FEEDBACK MECHANICS**
3 - plan actions or events for feedback
4 - file feedbacks
5 - give and receive student feedback

STORY-TELLING



"The elements of the story are not only engaging, but they guide the gamer through the game when he tries to fill in the elements of the story and achieve the objective of the game.Churchill and Antin, 2011

SYNONYMS AND VARIATIONS

storytelling, narrative, short story, make-believe.

TYPES AND CLASSIFICATIONS

Fun: keeps the student engaged and interested in what is to come;
Educational: arouses curiosity and increase the student's knowledge baggage;
Universal: they are associative to all students and relate to the emotions and experiences that most people go through or have gone through;
Organized: helps to convey the main message and understand abstract ideas and concepts;
Epics: whether through inspiration, scandal or humor, good stories stick to the student's mind

- it can engage students on an emotional level
- it brings meaning to new or abstract situations
- a great way to organize the progression and chronology of actions

WARNING

- do not create too long and complex stories
- the use of storytelling itself is not gamification

HOW TO USE IT

Structure adapted from Karl Kapp (2012):

1 - Performance Objectives: expected result
2 - Situation: its brief history
3 - Characters: who needs to be involved
4 - Objectives: character objectives
5 - Metrics: success indicators and objectives
6 - Barriers and conflicts: avoid boring stories
7 - Control: balance of Barriers and Conflicts
8 - Chain of Events: what should happen
9 - Predictable and Unexpected: surprises and innovations

LEADERBOARD

'They are designed to show an ordered list of users, providing a clear and instant understanding of the classification." Churchill and Antin, 2011

SYNONYMS AND VARIATIONS

scoreboard, table, ranking, list...

TYPES AND CLASSIFICATIONS

Social: made up of people from the user's circle
Public: Publicly allowed sharing
Single: contains all the information in one place
Game session: generated after an activity or game
Level: sorted by level without counting the score
Period classification: daily, weekly, monthly...

- it provides a context for the progression of points and badges
- strategies to level the classification of displaced students towards first place
- create leaderboards with different periods (weekly, monthly, semi-annual, ..)
- create leaderboards with different views (points, exercises performed, contributions to the forum)

WARNING

- leaderboards encourage competition, remember that the main objective is learning
- do not use a very long leaderboard, displaced students may feel unmotivated

HOW TO USE IT

1 - choose the type of leaderboard
2 - use PROGRESSION MECHANICS
3 - plan actions or events for the badges
4 - file the badges
5 - give and receive student feedback

GENERIC ELEMENT

Describe in a few words what the new element represents. Remember to quote the source, if it is from someone other than you." (Your name or the author, Year)

SYNONYMS AND VARIATIONS

describe here other possible names for this new element

TYPES AND CLASSIFICATIONS

Create classifications to group characteristics or establish progressions for your new element, to present a clearer vision about the intentions and possibilities of its use.

TIPS

- tips should be short and easy to understand
- tips serve to facilitate the understanding of the use of the element and its relationship with the game system
- an element must have a purpose, an objective
- combine elements with standard MECHANICS

WARNING

- excessive use of elements can lead to confusion
- avoid elements that require a lot of effort to execute
- share the relevant warnings or concerns when using the element

HOW TO USE IT

1 - write a guide on how to use your element
2 - share the MECHANICS used, when applicable
3 - test the use of the element
4 - get feedback
5 - make adjustments
6 - include the element in your toolbox

LEVEL CHALLENGE: CREATING A NEW ELEMENT CARD

Before creating a new element card, it is necessary to identify which element of the games can contribute to bring the student closer to the achievement of a learning objective, behavior change or, finally, contribute to the solution of a problem situation.

To do so, consider the following scenario: the teacher identified that a large number of students did not answer the last few questions in the practice test. When asked about the reason, the students replied that the 3 hours for the practice test were insufficient to answer the 6 questions contained in it.

Some of the element cards seen previously can contribute to this imagined scenario. The points and leaderboard elements can be combined as a source of indicators and incentives. A badge can be created and awarded to students who answer all questions in the simulation (regardless of the answers).

What other elements of games are perceived or can contribute to this scenario? There is no formal answer to this question, since it is going to depend on the experience of the teacher (or instructional and learning designer) in relation to the context, the elements of the games and how they relate. In this scenario you can notice that the students had difficulty regarding the time to take the practice exam. Time is a very common element used in games as a form of access/restriction, pressure/relaxation, dependent/related to other elements or linked to automatic/scheduled events. The act of using a watch or feedback to state every 30 minutes the current time and the time remaining for the completion of the exercise, practice exam, or exam is an external reinforcement, a call to action. By knowing how they are performing in relation to time, the student can reorganize their strategies and review their planning with each warning. A version of the time element card can be seen below:

Evaluate which other game elements can contribute to the projected scenario and create a new element card. Here are some suggestions: objective, chance and rarity. Use the table below reserved for the activity.

Objective: they are related to the learning objectives, they must be clear, explicit and known to all gamers (SCHELL, 2015). Synonyms: missions, milestones.

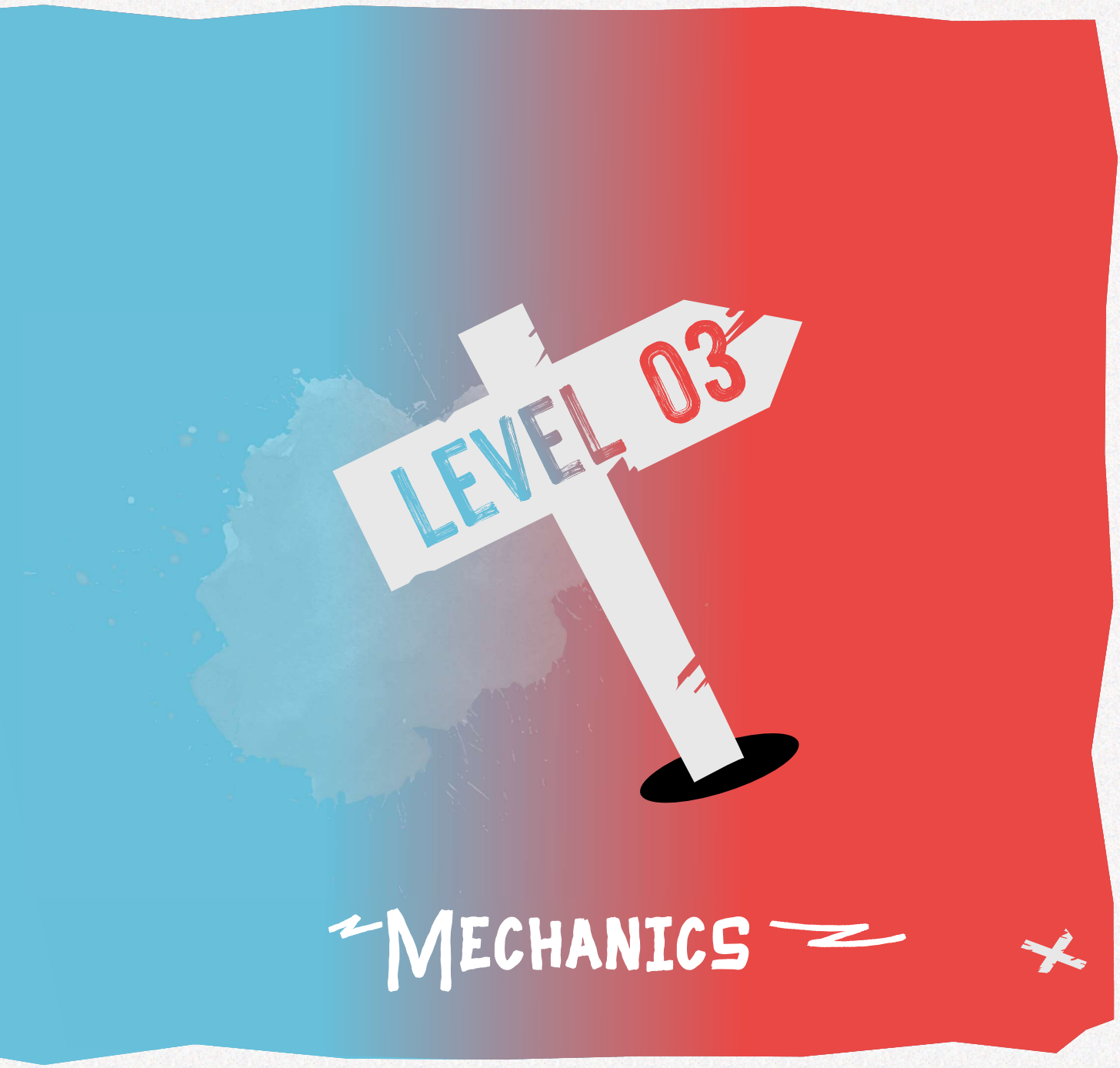
Chance: characteristics of randomness and probability to increase or decrease the chances of certain actions or results (TODA et al, 2019). Synonyms: randomness, luck, fortune, lottery.

Rarity: the items available or collected can be stored and used within the game to obtain some benefit or complete the objectives (KAPP, 2012). Synonyms: limited items, rarity, collection, acquire.

TIPS

WARNING

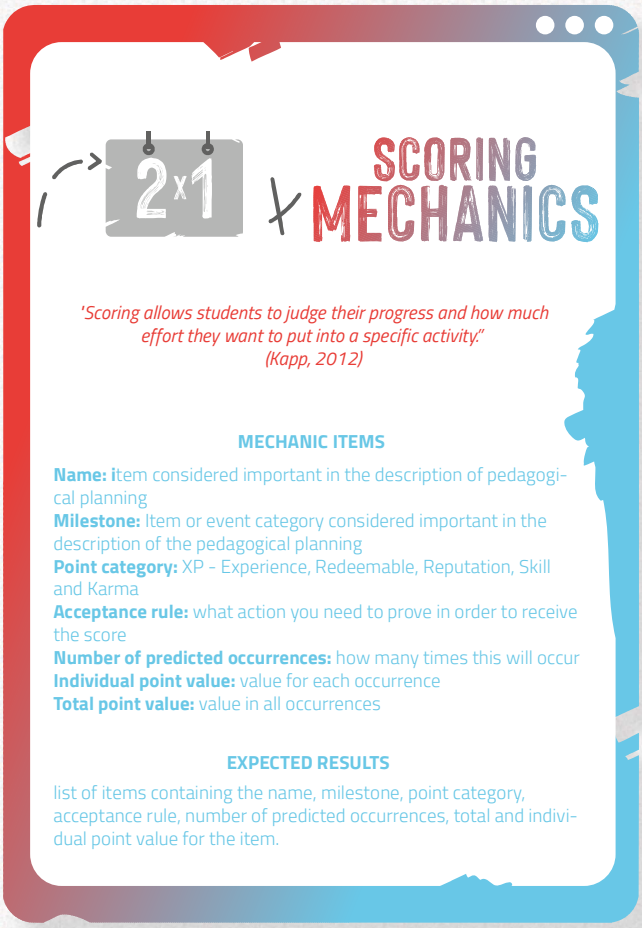
HOW TO USE IT

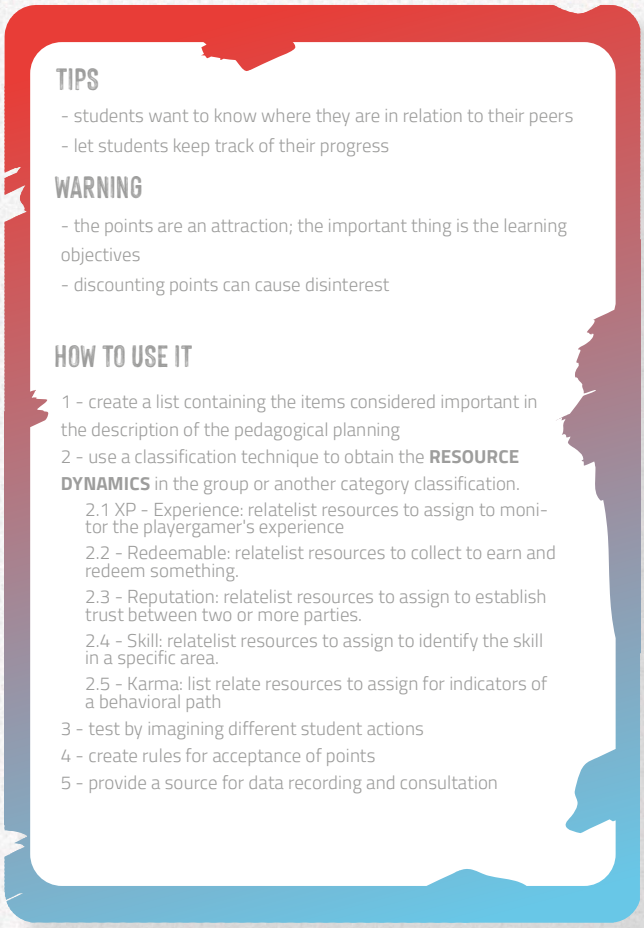

LEVEL 03
MECHANICS

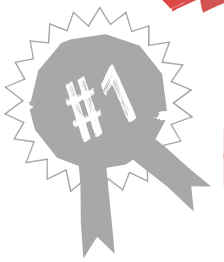
According to Zichermann and Cunningham (2011), mechanics consist of the functional components of the game. These are the fundamental rules in a gamification system, a contract that establishes how the game or gamification experience will occur. These are the rules that grant the gamification designer ultimate control over the game,, giving it the ability to guide gamers' actions. There is no standard classification for the use of mechanics; in addition, the inclusion of these items tends to be quite complex and very difficult to separate (ZICHERMANN; CUNNINGHAM, 2011), but it is possible to define them as being the interactions and relationships that remain when all aesthetics, technology and history are eliminated (SCHELL , 2015). In this way, they end up being the rules that establish how dynamics should boost students and move the gamification system.

Considering the scope of this book, some mechanics were selected as an example. The cards corresponding to the mechanics are described below. It should be noted that there is a provision for a generic card so that teachers can include other types of mechanics in the gamified strategy, which may be more appropriate to the reality of their classes. Another noteworthy point when planning the set of rules and the other information that makes up the mechanics of gamification consists of having a special care in relation to infoxication (KWIECINSKI, 2019).

INFOXICATION: "Overload of information and data that cannot be incorporated, and that, in this way, will not be transformed into knowledge" (KWIECINSKI, 2019).







BADGE MECHANICS

For game designers, badges are an excellent way to mark the completion of the goals and the steady progress of the game within the system." (Zichermann and 2011)

MECHANIC ITEMS

Name: item considered important in the description of pedagogical planning
Description: highlight the relevance of the new badge
Category: Definition of Goals, Instructional, Reputation, Status and Affirmation or Identification with the Group.
Acceptance rule: what action you need to prove in order to receive the badge
Who can offer it: who can order or offer the badge
Who can receive it: Who can receive the badge.

EXPECTED RESULTS

list of badges containing the name, description, category, acceptance rule, who can offer and receive the badge

TIPS

- a great way to group progressions and to control the game system

WARNING

- be careful with overlapping levels

HOW TO USE IT

1 - create a list containing the order of the main pedagogical planning milestones
2 - use a classification technique to obtain PROGRESSION DYNAMICS in the badge category:
  2.1 - Goal Setting: relate linear progression of the main pedagogical planning milestones
  2.2 - Instructional: relate hierarchical progression to learning objectives
  2.3 - Reputation: relate the progression of interaction of experiences in actions with other students
  2.4 - Status and Affirmation: events that represent the progression of the student's achievements.
  2.5 - Group Identification: identify progression of interaction and encourage the formation of group skills and interests
3 - test by imagining different student actions
4 - create rules for the acceptance of badges
5 - provide a source for data recording and consultation

LEVEL MECHANICS

'They are a great way to group progressions and control the game system." (Kapp, 2012)

MECHANIC ITEMS

Milestone: item or event considered important in the description of the pedagogical planning
Category: Game, Gameplay or Gaymer.
Acceptance rule: what action you need to prove to change levels
Name: as level presented to the student

EXPECTED RESULTS

- list of items containing the milestone, category, acceptance rule and name presented to the student for the item

TIPS

- a great way to group progressions and to control the game system

WARNING

be careful with overlapping badges

HOW TO USE IT

1 - create a list containing the order of the main pedagogical planning milestones.
2 - use a classification technique to obtain the PROGRESSION DYNAMICS in the level category:

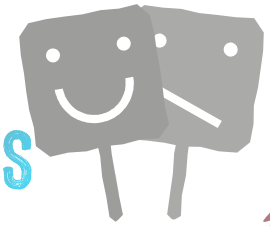
  2.1 - Game: relate the linear progression to the main pedagogical planning milestones.

  2.2 - PlayabilityGameplay: relate the hierarchical progression to the learning objectives.

  2.3 - PlayerGamer: relate the progression of interaction or progression of achievements to student experiences, using resources and activities related to pedagogical planning.

3 - test by imagining different student actions.
4 - create rules for acceptance of levels.
5 - provide a source for data recording and consultation

FEEDBACK MECHANICS



"To make sure that your feedback loop is creating the experience you want, ask the right questions in every moment of the game." (Schell, 2015)

MECHANIC ITEMS

Name: item in need of feedback
Message: highlight the relevance of the new badge
Category: Conformational, Corrective, Explanatory, Diagnostic, Natural, Artificial or Juicy.
Language: type of language to be used
Frequency: feedback periodicity

EXPECTED RESULTS

feedback lists containing the name, message, category, language, and frequency.

TIPS

- information must be standardized and complete

WARNING

- an excessive information load can lead to infoxication.

HOU TO USE IT

1 - create a list containing the order of the main pedagogical planning milestones
2 - use a classification technique to obtain the feedback category:
  2.1 - Conformational: relate linear progression
  2.2 - Corrective: relate hierarchical progression
  2.3 - Explanatory: relate the progression of interaction of experiences in actions with other students
  2.4 - Diagnosis: events that represent the progression of the student's achievements
  2.5 - Natural: identify progression of interaction
  2.6 - Artificial: identify progression of interaction
  2.7 - Juicy: identify progression of interaction
3 - test by imagining different student actions
4 - create rules for the acceptance of badges
5 - provide a source for data recording and consultation

GENERIC MECHANICS

Describe here in a few words what the new mechanics represents. Remember to quote the source, if it is from someone other than you.
(Your name or the author, Year)

MECHANIC ITEMS
describe here the items that correspond to mechanics

EXPECTED RESULTS
describe what is the expected result with the use of mechanics, what it provides as far as information for planning, execution, and assessment of mechanics.

TIPS

- tips should be short and easy to understand
- tips serve to facilitate the understanding of the use of mechanics and its relationship with the game system
- a mechanic must have a rule for an objective

WARNING

- complex mechanics cause confusion
- avoid mechanics that require a great effort for its realization

HOW TO USE IT

1 - write a guide on how to use your mechanics and your items
2 - test the use of mechanics
3 - get feedback
4 - make adjustments
5 - include mechanics in your toolbox

LEVEL CHALLENGE: CREATING A NEW MECHANICS CARD

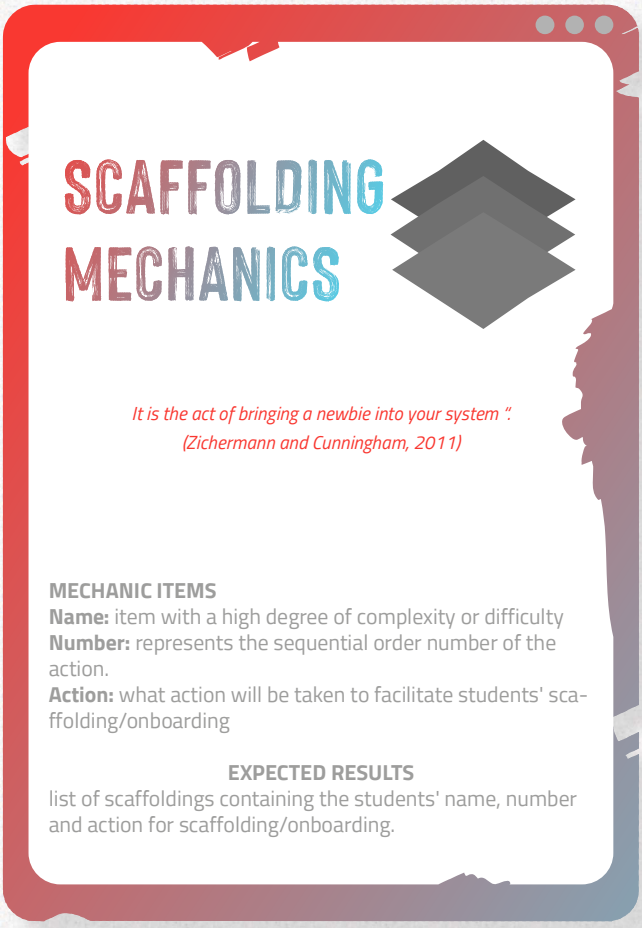
As we did in the previous challenge, to create a new mechanics card it is necessary to identify which mechanics of the game make up the rules to guide students in interacting with the elements related to the learning objective, behavior change, or solution of a problem situation.

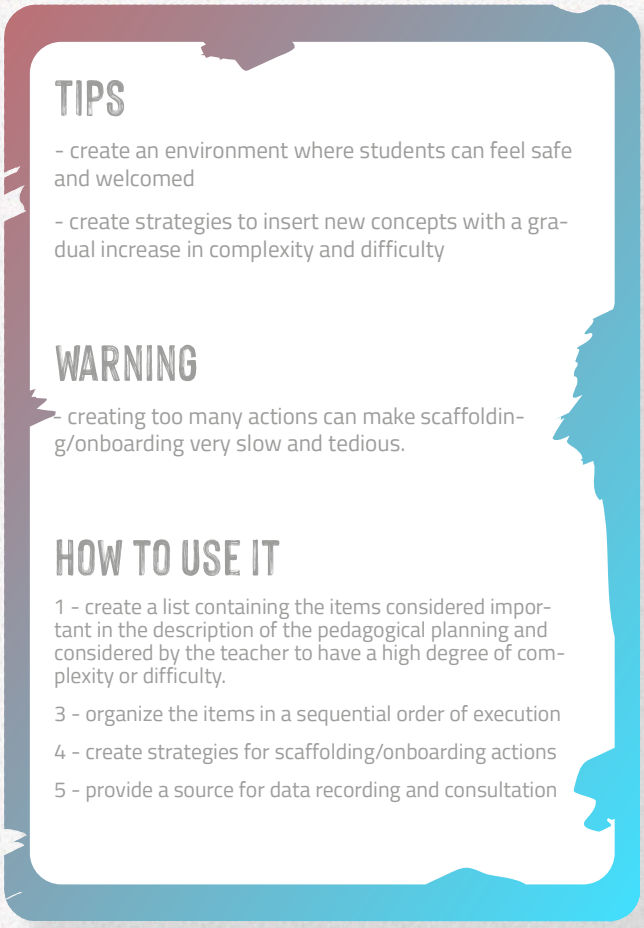
Consider the following scenario: *the teacher wants to bring new content to their students, but they believe that students have little familiarity with the topic.*

Some of the mechanics cards seen previously can contribute to this scenario, among which the level mechanics can be used as a way to obtain a picture of the skills and the student's current experience.

Feedback mechanics can be used to guide students and direct them towards goals. Feedback mechanics can be used to guide students and direct them towards goals.

What other game mechanics are perceived or can intervene in the scenario described? This is going to depend on the experience of the teacher (or instructional and learning designer) in relation to the context, the mechanics of the games, and how they are related. It is noticeable, in the hypothetical situation, the teacher's concern that the students do not have sufficient prior knowledge to move forward on the content. A very common game mechanics, known as scaffolding or onboarding, is used in situations like this is in order to mobilize students progressively towards the learning objectives through tips, simulations, examples, among others. The act of providing previous teaching material, or introducing





the basic concepts for new learning first, illustrates this mechanism. Once the student is introduced progressively to the content, in order to build new knowledge gradually. A version of the scaffolding mechanics card can be seen above.

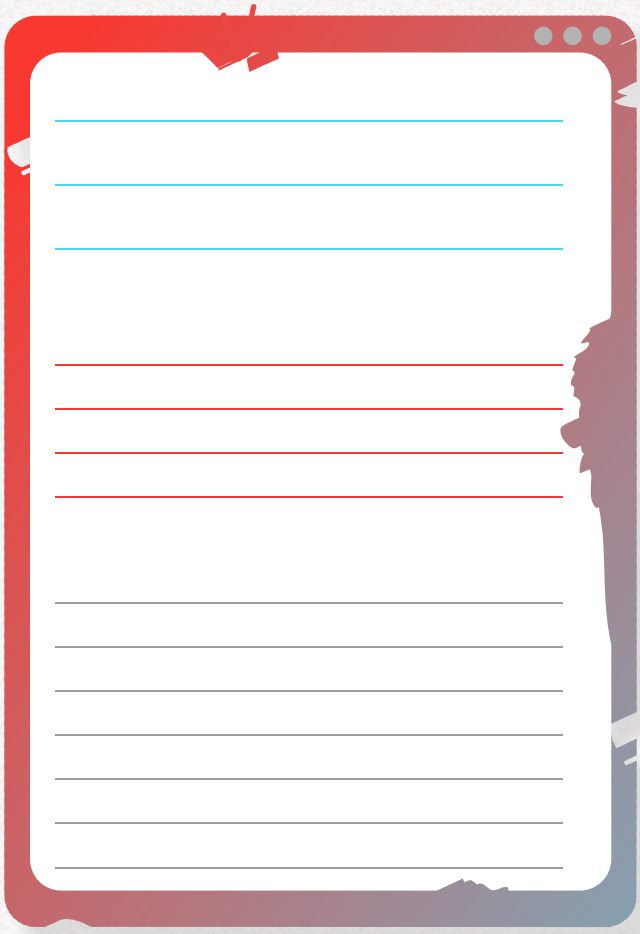
Based on this scenario, what game mechanics could contribute? You must create your own card with a mechanism that guides students towards achieving their learning objectives. Think about how the rules for the mechanics of the following game elements would be like: transaction, renewal and reputation.

Use the table reserved below for the activity.

Transaction: transactions within the game, monetizing game values and other elements (TODA et al, 2019). Synonyms: markets, economies, exchanges, banking.

Renewal: redo or restart an action, restarting the game provides freedom to test skills, explore paths, compare strategies used, and increase knowledge and mastery (KAPP, 2012). Synonyms: extra useful life, repetition, renewal.

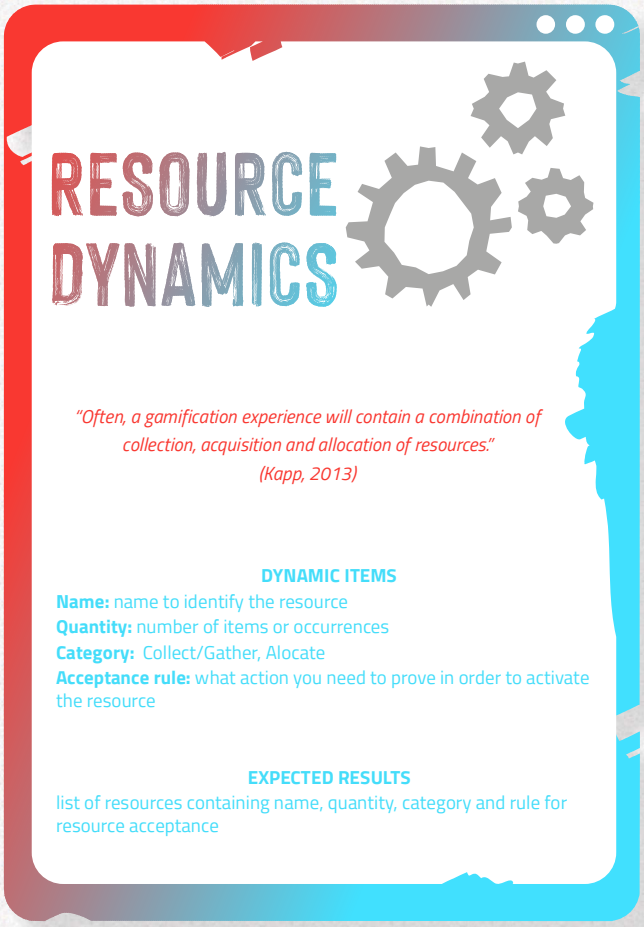
Reputation: titles that the gamer owns, it provides a summary of a member's interests and levels of involvement in a community or group (CHURCHILL; ANTIN, 2011). Synonyms: titles, status, classification.

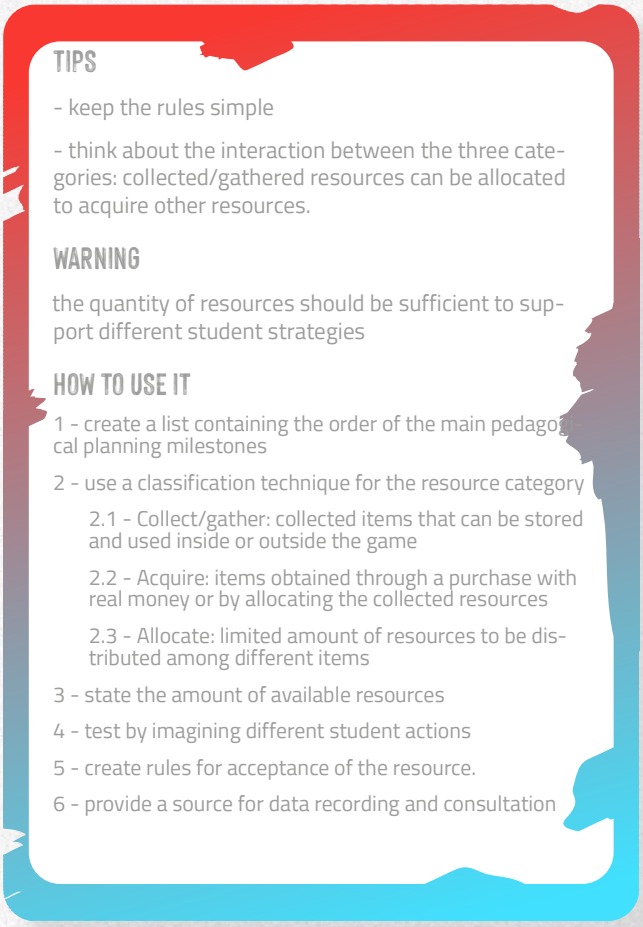


LEVEL 04

DYNAMICS

Dynamics can be used to apply certain learning strategies, such as setting goals, managing time, seeking help or information, and self-assessment. They are a way of organizing and planning learning, before and during the performance, so that, when reviewing tasks, students can check the results they obtained (FRISON, 2016, p. 3). According to Goethe (2019), the use of dynamic activities in groups has been constituted as one of the most relevant methods for carrying out educational activities (GOETHE, 2019), as the mechanics provide the origin of the dynamic behavior of the system to involve participants in meaningful emotional experiences (HUNICKE et al, 2004). Dynamics mean the general aspects of the gamification system that you must consider and manage, but which you may never directly interfere with during the game. The dynamics make it possible to explore the 21st century skills that are necessary for students in the use of learning strategies to interact with the rules defined by mechanics.





PROGRESSION DYNAMICS

"The players want to know where they are in relation to their peers, the game, and their previous experiences."
(Werbach and Hunter, 2012)

DYNAMIC ITEMS

Name: name to identify the progression
Category: Linear, Hierarchical, Interaction or Achievements.
Acceptance rule: what action needs to be taken to accept progression

EXPECTED RESULTS

list of progressions containing the name, category, and rule for accepting the progression

TIPS

- progressions can be excellent indicators of knowledge and mastery.

- think about using tables and graphs to present progressions.

WARNING

- too many indicators can confuse the students

HOW TO USE IT

1 - create a list containing the order of the main pedagogical planning milestones

2 - use a classification technique for the progression category

- 2.1 - Linear: linear order of progression
- 2.2 - Hierarchical: when verifying an item, the structure below is considered completed
- 2.3 - Interaction: experiences in actions with activities, content and other students
- 2.4 - Achievements: nonlinear achievements that demonstrate progress

3 - test by imagining different student actions

4 - create rules for accepting progression

5 - provide a source for data recording and consultation

INTERACTION DYNAMICS

"They represent how the gamer interacts with other gamers, reflecting on their strategies and attitudes in the game."
(Kapp, 2012)

DYNAMIC ITEMS

Name: name to identify the interaction
Description: highlight the relevance of the dynamics of the proposed interaction
Category: Conflict, Cooperation and Competition

EXPECTED RESULTS

list of intentions of interactions of the name, description and category

TIPS

- they influence directly the game system and even the student´s emotional state

WARNING

- excess information can cause infoxification

HOW TO USE IT

1 - create a list containing the order of the main pedagogical planning milestones

2 - use a technique for the interaction category:

- 2.1 - Conflict: creating strategies in which students must overcome other students, individually or in a group, only one student or group wins
- 2.2 - Cooperation: creating strategies in which students must work with others to achieve mutual results and benefits.
- 2.3 - Competition: creating strategies in which one or more students seek to find out who has the best performance, the best individual or collective result.

3 - test by imagining different student actions

4 - provide a source for data recording and consultation

BALANCING DYNAMICS

"The game needs to strike a balance between the relationship of the challenges and the skill level intended for the player to overcome the activity. "
(Kapp, 2012)

DYNAMIC ITEMS

Name: name to identify the balancing
Description: highlight the current situation and the observed need for balance.
Category: Element, Mechanics, Dynamics or Behavior
Need for Adjustment: highlight the actions necessary to balance the game

EXPECTED RESULTS

list of noted balancing containing the name, description, category and the need for adjustment.

TIPS

- progressions can be excellent indicators of knowledge and mastery.

WARNING

- too many indicators can confuse the students.

COMO USAR

1 - create a list containing feedback and other collected information.

2 - use a technique for the balancing category:

2.1 - Element: checking the dependency onwith other elements.

2.2 - Mechanics: checking the dependency onwith other rules of the game system.

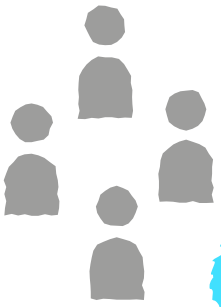
2.3 - Dynamics: checking the dependence on other activities and trying other dynamics.

2.4 - Behavior: checking the relationship with others behaviors alreadythat have already been perceived.

3 - test by imagining different student actions.

4 - provide a source for data recording and consultation

SOCIAL DYNAMICS



"A motivating emotion leads to the player's re-engagement, which leads to a call to social action."
(Zichermann and Cunningham, 2011)

DYNAMIC ITEMS

Name: name to identify the event or social action.
Description: highlight the desired situation
Category: public or private

EXPECTED RESULTS

list of social dynamics with the name, description, and categories of the social dynamics

TIPS

- progressions can be excellent indicators of knowledge and mastery.

WARNING

too many indicators can confuse the students.

HOW TO USE IT

1 - create a list containing feedback and other collected information.

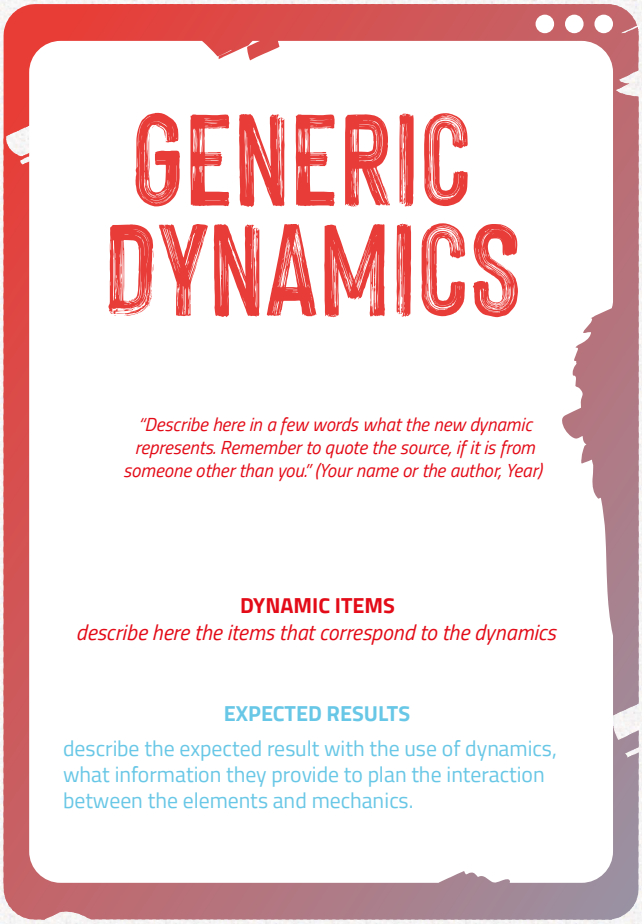
2 - use a technique for the category of social dynamics:

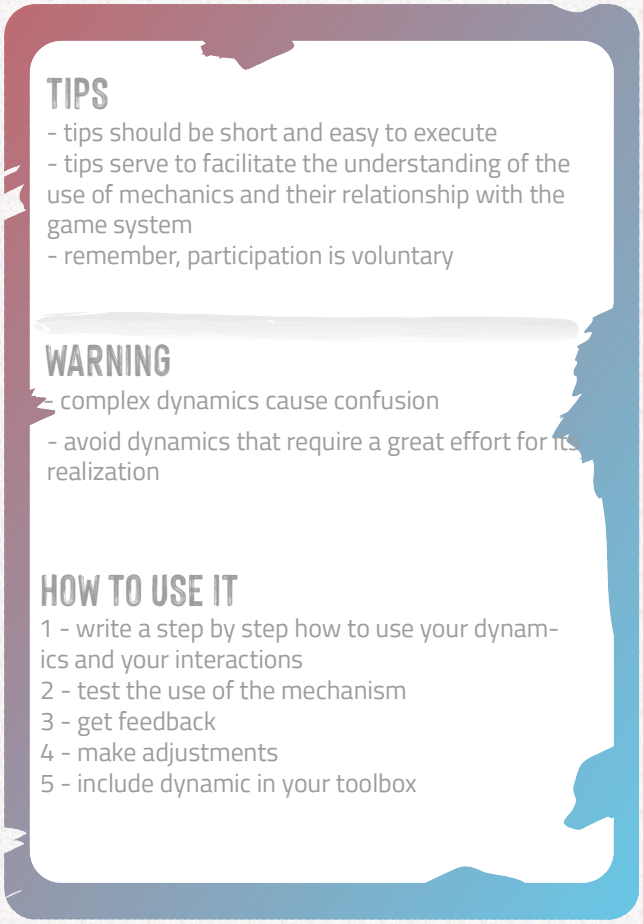
2.1 - Internal: internal public with only one class or group.

2.2 - External: external public with more than one class or group.

3 - test by imagining different student actions.

4 - provide a source for data recording and consultation





LEVEL CHALLENGE: CREATING A NEW DYNAMICS CARD

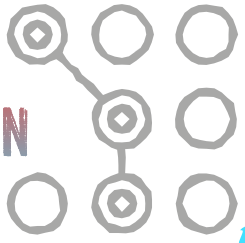
To create a new dynamics card, it is necessary to identify which learning objective, behavior change or problem-situation resolution is desired. From that, verify which game dynamics can help achieve this result in conjunction with other elements being used.

Consider the following scenario: the teacher noticed that, even when students have the option of doing group activities, many prefer to work alone; however, the teacher believes that if students worked in groups they could take advantage of other aspects contained in the activities, involving collaboration and the request for help, among other socio-behavioral aspects.

Some of the dynamics cards seen previously can contribute to the presented scenario, including social dynamics, that can be used to obtain information about how the students relate. A direct question to the class can provide natural feedback on whether or not there is a lack of rapport between students.

What other game dynamics are perceived or can contribute to the described scenario? A very common game dynamics, known as Pattern Recognition, is used in situations like this in order to promote, identify, and predict patterns of behavior based on students' actions and attitudes. The way students position themselves in the classroom and the list of activities delivered individually can provide a clue about their behavior. A version of the dynamics card Pattern recognition can be seen below:

PATTERN RECOGNITION DYNAMICS



"The capacity to recognize order in chaos or to see relationships in disconnected information. It involves creating, identifying, or predictinga pattern." (Kapp, 2012)

DYNAMICS ITEMS

Name: name of the pattern
Description: describe how the pattern works.
Category: create, Identify, Predict

EXPECTED RESULTS

list of patterns with the name, description, and the pattern categories.

TIPS

- start with simple and tangible patterns and then work toward more complex and abstract patterns

- provide several opportunities for students to recognize patterns

WARNING

- for students with more knowledge, standards can be more obscure

- for students that are newer to the topic, keep more basic patterns

HOW TO USE IT

1 - create a list containing patterns to be created, identified or predicted.

2 - use a pattern recognition category:

2.1 - Create: create patterns that can guide behavior to create new habits.

2.2 - Identify: identified patterns that can assist in the creation of learning strategies.

2.3 - Predict: anticipate the patterns commonly found in the context under analysis.

3 - test by imagining different student actions.

4 - provide a source for data recording and consultation.

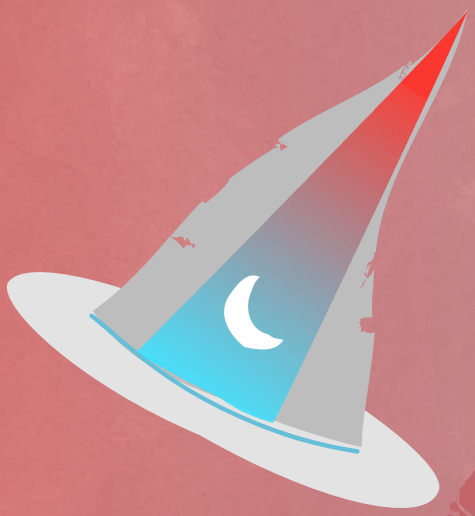
In this scenario, the creation or strengthening of new groups is planned. So, evaluate game dynamics that can favor this behavior, enabling them to achieve the learning results. Your challenge is to create another card that can guide students to make a change in behavior in relation to the suggested scenario. Some suggestions for dynamics: build and create, innovation and strategy.

Use the table on page 45 to do the activity.

Build and Create: using resources to build or create something new or unique. (KAPP, 2012). Synonyms: develop, assemble, transform.

Innovation: new and updated information presented to the gamer constantly (TODA et al, 2019). Synonyms: changes, surprises, updates.

Strategy: requires students to overcome and maneuver other gamers through careful decision-making, planning various moves ahead and trying to predict the results (KAPP, 2012). Synonyms: move, plan, planning.



TIPS

WARNING

HOW TO USE IT


LEVEL 05
BEHAVIORS

The use of gamification in education is a way to encourage desired behaviors in students in search of a more dynamic, fast and enjoyable learning process (GOETHE, 2019). Each gamification element has a set of mechanics that defines the students' interaction dynamics, resulting in a behavior that game designers call aesthetics or emotional state (HUNICKE et al.; 2004). In this sense, choosing a gamification element for your game system is also thinking about the mechanics and dynamics that are part of it. An empathic behavior or an emotional state of relaxation cannot be expected, when using dynamic interaction with conflict or adding an element of time pressure.

Behaviors and emotional states are abstract, not being explicitly visible and defined. They need special attention when planning and balancing your gamification system, being responsible for keeping students connected to the experience. Encouraging behavior means creating situations and designing the environment so that the intended behavior can emerge spontaneously. Taking this into account, the teacher's intention in promoting group work and activities can boost dialogue and collaboration between students, while individual tasks can, in turn, provide students with the opportunity to test their autonomy.

EMPATHY

"Empathy, in summary, is the ability to put yourself in the other's place, experiencing their point of view."
(Vedove and Camargo, 2008)

- Cultivate curiosity about the unknown
- Challenge prejudice and discover things in common
- Experience someone else's life
- Listen openly
- Inspire action
- Develop an ambitious imagination

EXPECTED RESULTS

list containing opportunities and strategies to encourage behavior.

TIPS

- be empathic with your students
- create a warm and welcoming environment
- encourage activities among students who are not yet known
- create less formal communication channels for sensitive issues

WARNING

- participation should always be voluntary

HOW TO USE IT

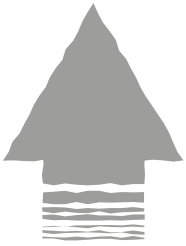
1 - create a list containing the order of the main pedagogical planning milestones

2 - choose ELEMENTS that can boost the desired emotional state or behavior.

3 - create a list of opportunities and strategies to encourage behavior directly or favored by the combined use of an element

4 - provide a source for data recording and consultation

SELF-EFFICACY



'It involves motivational beliefs in relation to personal competence to perform a task, such as correcting a sentence for grammatical errors."
(Zimmerman, 2015)

- It has a direct relationship with the motivational dimension
- The more the student believes in his success, the greater his self-efficacy
- Proactive students are motivated by self-efficacy beliefs
- Goals and objectives direct students to select different strategies

EXPECTED RESULTS
list containing opportunities and strategies to encourage behavior

TIPS

- be empathetic with your students
- create a warm and welcoming environment
- encourage activities among students who do not yet know each other
- create less formal communication channels for sensitive issues

WARNING

- participation should always be voluntary

HOW TO USE IT

1 - create a list containing the order of the main pedagogical planning milestones

2 - choose ELEMENTS that can boost the desired emotional state or behavior.

3 - create a list of opportunities and strategies to encourage behavior directly or favored by the joint use of an element

4 - provide a source for data recording and consultation

TIME MANAGEMENT

'Time management is the act or process of planning and executing conscious control over the amount of time spent on specific activities, especially to increase effectiveness, efficiency and productivity." (Zichermann and Linder, 2013)

- Time is money!
- Greater productivity and efficiency
- Proactive students are motivated by self-efficacy beliefs
- Goals and objectives help students to direct their actions in relation to time

EXPECTED RESULTS
list containing opportunities and strategies to encourage behavior

TIPS

- the use of progressions with time management drives behavior during a controlled period.
- create strategies to organize activities with and without a specific time frame

WARNING

- time can be a source of pressure when it is too shor
- exaggerated amounts of time can lead to procrastination

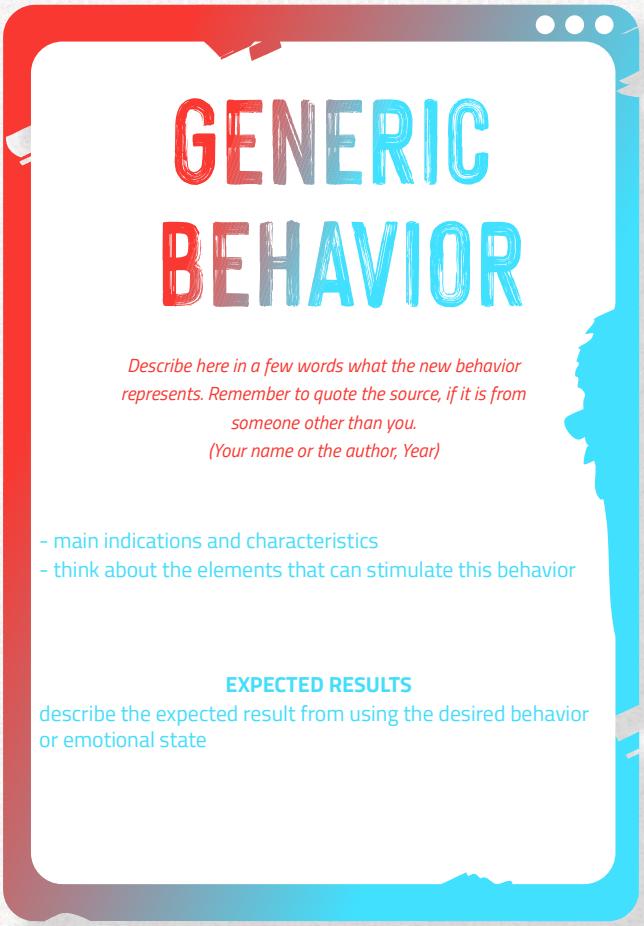
HOW TO USE IT

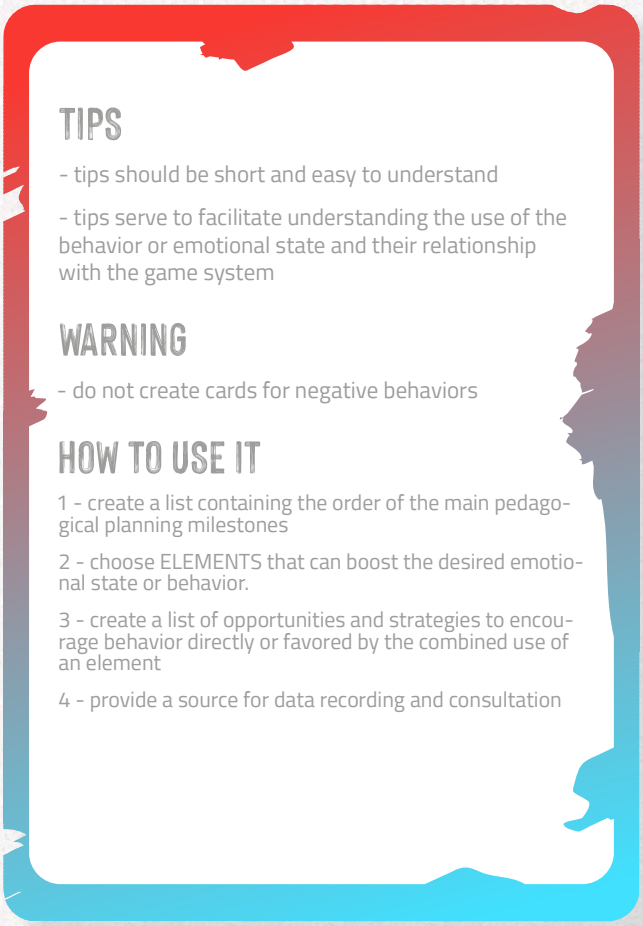
1 - create a list containing the order of the main pedagogical planning milestones

2 - choose ELEMENTS that can boost the desired emotional state or behavior.

3 - create a list of opportunities and strategies to encourage behavior directly or favored by the combined use of an element

4 - provide a source for data recording and consultation





LEVEL CHALLENGE: CREATING A NEW BEHAVIOR CARD

To create a new behavior card, it is nec essary to identify which behaviors and what emotional state we hope to awaken, reinforce, or inhibit in students during and after interaction with the proposed dynamics. It is also required to take into account the influence generated by other elements that may potentially interfere with the current state of the gamification approach.

Consider the following scenario: before the final exam, many students were concerned about their previous poor performance and said that they did not feel confident to take the test.

Some of the behavior cards seen earlier can contribute to this scenario. Among them, self-efficacy behavior can be used as a way to situate students in relation to their current knowledge and what they need to achieve their goals. Reviewing the content, going through sequentially the concepts learned so far, and providing a quiz or practice test for students to test their skills are ways of reinforcing their self-motivation and self-efficacy beliefs, remembering that self-efficacy behavior refers to how much students think they are capable of winning the challenge.

What other game behaviors are perceived or can contribute to the outlined scenario? A game behavior used in situations like this consists of trying to engage students in their own learning. Engaging is going beyond the simple "wanting", being necessary to guide efforts with intentional

actions to align students' personal goals with their learning objectives. It is possible to use students' expectations regarding their career, the market in which their course operates, and their personal lives as important points of connection between what students learn in class and their personal expectations.

A version of the Engagement behavior card can be seen below:

ENGAGEMENT

'In essence, gamification is about engaging people on an emotional level and motivating them to achieve their goals." (Burke, 2016)

- encouraging behaviors can become desirable habits
- engage students emotionally to achieve the best of themselves

EXPECTED RESULTS

list containing opportunities and strategies to encourage behavior

TIPS

- focus on behavior by activity
- provide multiple opportunities for students to reinforce desired behavior
- don't forget to align the students' goals with their learning goals

WARNING

- not all engagement is the same
- transactional engagement strategies alone do not trigger engagement

HOW TO USE IT

1 - create a list containing engagement objectives sorted from most important to least important.
2 - create a list containing opportunities and strategies to encourage behavior
3 - test by imagining different scenarios
4 - provide a data record source

Now, think about how other behaviors and emotional states that may be experienced in games can guide students in relation to the presented scenario. Some suggestions for behaviors and emotional states: looking for help, self-reflection, and collaboration. Use the table reserved below for the activity.

Self-motivation to overcome oneself and ask for help to a peer or someone more prepared (FRISON, 2016, p. 75).

When the student self-evaluates their performance and prepares for the next learning situation. (GANDA et al, 2016).

Cooperation: it is the act of working with others to achieve a mutually desirable and beneficial result (KAPP, 2012).

TIPS

WARNING

HOW TO USE IT


N

The game system

The PBL Triad composes the mechanics and dynamics created by the use of of points, badges, and leaderboard, and it is present in most projects that apply the gamification approach. In a way, there is a "similarity" between the cumulative assessment system with grading and the mechanics that involve PBLs, as they both assign some kind of value strategy (points) when planning a learning unit. These values serve as indicators for classifying the situation and progress (leaderboards) of students in relation to the assessment frameworks established by the teacher, even if they are not disclosed to students.

Another common practice is the creation of markers (badges) that represent achievements or serve to boost activities and behaviors, such as the "little star in the notebook" - a symbol used by teachers to encourage students to seek excellence in tasks - and the compositions in which part of the assessment is related to students participation in activities or skills training.

In this sense, the MDA can guide the planning of the PBL Triad in your gamification project. Based on their vision, the game designer uses mechanics (rules), which are accessed through dynamics (system) in order to provide a certain aesthetic (behavior or emotional state) for the gamer (as shown in Figure 4) (HUNICKE et al. 2004). The same orientation can be used to create your gamified experience.

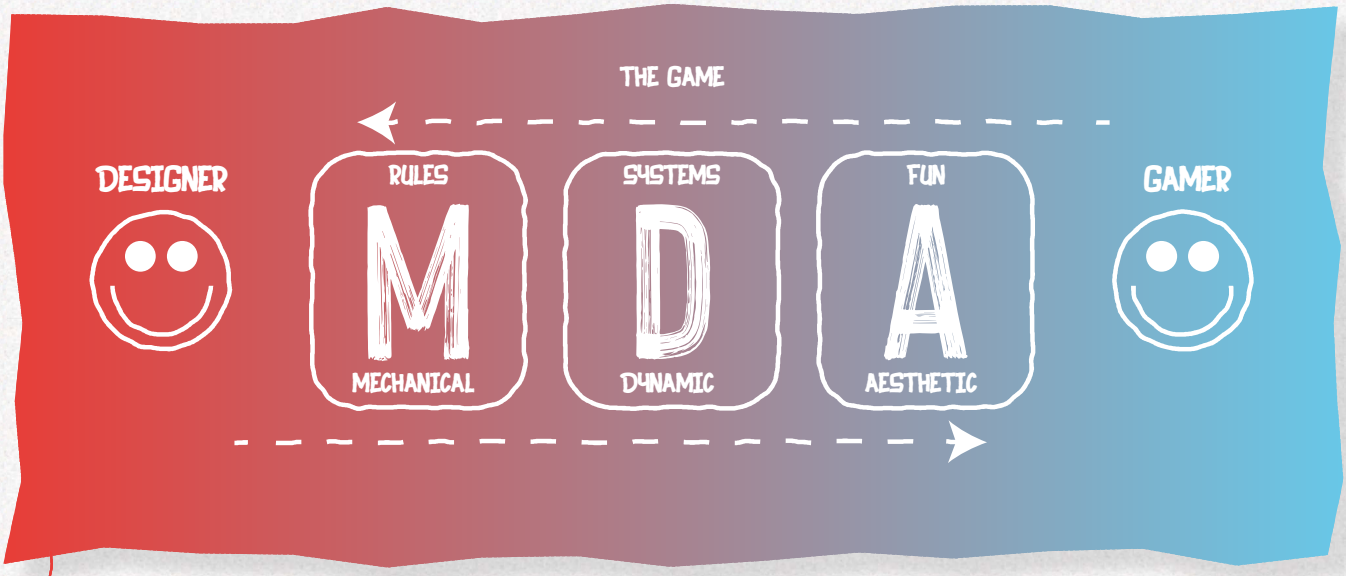


Figure 4 - Perspectives of the Designer and the gamer
Source: Adapted from Hunicke et al.(2004)

In general, when thinking about the gamification of learning, we imagine how transformative it can be and its potential to turn lessons that are usually boring into pure fun. However, it is important to remember that gamification does not mean turning something boring into something fun (this is an expected consequence of an intentional process), nor does it transform the class into a game. As the self-regulation of learning, gamification is an intentional process where it is necessary for students and teachers to work together on a voluntary basis, with active roles. Many game elements are already contained in the planning of a discipline and in the teacher's practices, however, they are not always used correctly, either due to lack of knowledge or because they are not perceived on a daily basis. The instructional and learning design of academic planning is made through learning units. According to Filatro (2008), learning units are atomic or elementary units that "contain the elements necessary for the teaching/learning process" (FILATRO, 2008, p. 43) and have a close relationship with game elements. Table 2 illustrates a view of the relationship between the elements of a learning unit and the elements of gamification.

Table 2 - Relationship between the elements of a Learning Unit and the elements of gamification
Source: Prepared by the authors (2020).

Elements of a Learning Unit	Definitions	Elements of Gamification
Identifier	They relevantly identify the main learning objective or concept	Badges, Pins, Trophies, Medals, levels ...
Learning objectives	They describe the desired result, what the students will be able to do when they have mastered the unit	Game Objectives, Missions, Strategy ...
Roles (teacher, student, tutor, monitor ...)	They represent who they are and what the actors involved will do	Characters, Avatar, Social, Request for Help, ...
Activities	They involve the set of actions that students must perfom to achieve the objectives	Challenges, Mystery, Restrictions, Special Access, Pattern Recognition, ...
Duration and Period	They are related to time and the schedule for the execution of activities.	Time, Rules, Stages, Phases ...
Tools	instruments and functionalities necessary for students to access the content or perform an activity	Quiz, Drawings, Puzzles, ...
Content	Materials needed to meet educational objectives and related to previous concepts	Storytelling, Scaffolding, Bonuses, ...
Assessment	It states how to verify if the unit's learning objectives have been achieved	Feedback, Competition, Collaboration, Epic Moment, Boss, Rules, ...

Its flexible format favors the creation of instructional design and learning projects with different amplitudes: extensive and complex as a complete curriculum of an undergraduate course or brief and simplified as a learning activity based on a grade review for 15 minutes. Taking this into account, start by designing the use of gamification around pedagogical planning and what is already done in class. This is going to make the experience more pleasant and allow you to focus your attention on your own planning, using what has already been produced together with the elements of gamification.

"Do not be fooled: people try to explore any system ... it should not be a mental impediment in the early stages of design. It is just a statement of fact "(ZICHERMANN; CUNNINGHAM, 2011, p. 72). Think about it while planning your activities.

USE OF PLEA FOR GAMIFICATION PLANNING

"Choose, control and reflect!" (ROSÁRIO, 2004a, p. 80), thus the researcher Pedro "Choose, control and reflect!" (ROSÁRIO, 2004a, p. 80), in this way the researcher Pedro Rosário summarizes the movement of self-regulated of learning on which the PLEA is based, a model that seeks to provide a way of self-reflection on the use of learning strategies. Table 2 exemplifies a planning structure, inspired on PLEA, linking it to gamification theories. In addition, it raises some essential questions to plan a gamified learning experience that is based on self-regulation. Inspired by the publication by Alexander Osterwalder and Yves Pigneur (2013), on the use of canvas in the generation of business innovation models, we created a canvas to guide the use of PLEA as a teaching tool in gamification. Besides assisting pedagogical planning, PLEA is able to aggregate the necessary questions to integrate the gamification approach through the elements perceived in thedetailing of context, environment, and observed needs to guide students towards the learning objectives. Note that the sections of the canvas in Figure 5 and the tips of the steps are preceded by the self-regulatory learning strategy number, as described by Zimmerman and Martinez-Pons (1986), presented in Table 3.

Table 3- PLEA on canvas adapted as a teaching tool in the context of gamification
Source: Prepared by the authors (2020).

Planning

THE CONTEXT:
6. Environmental Structure
Who are the actors involved (student, teacher, tutor, monitor, ...)?
Where does this occur? In which environment?
What is the current situation?

LEARNING OBJECTIVES
3. Goal setting and planning:
What is the main or specific desired learning objective?
What behavior or emotional state is expected?
How is the main or specific desired learning objective going to be assessed?

1.Self-assessment:
What do I need to know?
What do I need to do?
What steps should I follow? (generic step by step)

GAMIFICATION
What are the perceived gamification elements?
What gamification dynamics are perceived?
Which gamification strategies are feasible to be applied at this time?
What steps should I follow? (generic step by step)

STAGE TIPS
1. encourage students' self-assessment of the quality and progress of their work
3. encourage goal setting, time management and planning for activities.
6. propose a receptive and welcoming physical and psychological environment for new ideas and experiences.
9-11. take initiatives so that students can guide their efforts to seek help from peers, teachers and outside sources.

Execution

LEARNING OBJECTIVES
2. Organization and transformation
Is the environment appropriate?
Am I following the plan?

STAGE TIP
2. create, organize, and improve the practices and resources being used
4. encourage the search for information and complementary activities
5. encourage students to file information about their experiences through self-reports and, when possible, use tasks that favor automated data collection
8. create and organize gradual practices to insert new concepts, relating them, whenever possible, with previously worked concepts
8. create strategies so that students can revisit resources and activities that have already been completed.
8. create strategies for the student to perceive the error as natural information (feedback), a step towards learning, and not to be seen by the student as a "failure" or "loss."
15.1 facilitate action and standardize responses whenever possible
15.2 create triggers to awaken reactions
15.3 provide feedback so that students can direct their efforts

Assessment

LEARNING OBJECTIVES
12-14. Data Review
How was the execution of the plan?
What were the difficulties encountered?
What did you learn?
Write down your impressions about the process here. How did you feel?

GAMIFICATION
What were the feedbacks received and information collected? What is the need for balance observed?
What is the need for balance observed?

STAGE TIPS
7. make students aware of consequences and results of their actions.
12-14. encourage the filing and reviewing of information through the use of notes, self-reports, forums and other ways to collect data.

LEVEL CHALLENGE: CREATING YOUR GAMIFICATION

Now it is time to plan your gamification approach. Start by organizing information and documents related to the activity, discipline, or even the course. Think big, but start small: gamifying an entire course can be a complicated experience at first. Start with pedagogical planning, extract data from collected documents, and test with smaller scenarios.

DON'T FORGET THE FUN!

On the book's website[3] there is a blank version of PLEA on canvas adapted as a teaching tool in the context of gamification with space for the activity, as well as other versions of the canvas and additional materials that can help compose your strategies.

[3]- https://mpie.poa.ifrs.edu.br/livros/magicalbookofgamification

GAMIFICATION IN PRACTICE

When performing a search in the literature linked to gamification, it is noticed that there are not models or methodologies that help in the construction of a gamified strategy in a practical way. Thus, this chapter focuses on describing the practices used in the elaboration of an educational project, where the gamification succeeded. Therefore, Figure 5 contains the description of the pedagogical structure of a discipline. The information contained therein are going to be used in the creation of our exemplified gamification system.

Tell a story: the discipline is divided into 5 learning objectives, distributed in 16 classes, where each learning unit corresponds to the planning for a learning objective; Two assessment simulations, 2 assessments, and an assessment retake , if necessary, are foreseen. In addition, a percentage of the grade is assigned for participation in activities and the delivery of tasks by the student. The course contents are distributed in10 texts, 5 videos, 2 podcasts, and 2 books. The list of activities and tasks presents 30 exercises (3 per learning unit), 2 research activities, 1 collaborative wiki, 3 questionnaires, and a forum to debate the discipline. Complementary activities and tasks, such as empathic listening dynamics, technology fairs, research and other events related to the academic week are part of the calendar, as well as health campaigns and other that may interest students. Create practices that promote concepts such as empathy, society, collaboration, common welfare and security.

Figure 5 – Example of the description of the pedagogical structure for a discipline
Source: Prepared by the authors (2020).

To create scoring mechanics, a good strategy is to establish a list containing the items considered important in the description of the pedagogical planning. Table 4 presents a list, containing the name, category, acceptance rule, number of expected occurrences, and the value in points - total and individual - for each one.

Name	Milestone	Category	Rules	Occurrences	Value	Value
Learning Objectives	Learning Objectives	Skill	Complete	5	100	500
Class	Class, Meeting, Workshop,...	XP - Experience	attendance	16	250	4000
Practice test	Practice test, Exam, Challenge,...	Skill	Send	2	150	300
Assessment	Test	Skill	Deliver	2	250	500
Retake Assessment	Retake test	Skill	Deliver	1	150	150
text, videos, podcasts, and books	Articles, Texts, Videos, Podcasts, Books,...	XP - Experience	Complete	19	100	1900
Exercises	Exercise	Redeemable	Send	30	50	1500
Questionnaires	Opinion poll, questionnaires, survey,...	XP - Experience	Send	3	75	225
Wiki, research	Forum, Wiki, Collaborative Text, Blog, Research, ...	XP - Experience	Share	3	75	225
dynamics, fairs, research, and extra activities	External Event	XP - Experience	attendance	4	100	400

Table 4 - Exemplifying the Scoring Mechanics
Source: Prepared by the authors (2020).

As students interact with the items that compose the scoring mechanics, theresults of the points are recorded and, for each rule completed, they can be used as indicators for analysis and other teacher's assessments of the class. This makes it possible to develop different Leaderboard types so that students are aware of their progress in relation to their colleagues, in the categories highlighted in the planning of scoring mechanics. Table 5 presents three examples of the use of leaderboards based on the categories and rules established in the scoring mechanics.

Classification by Points		
position	name	points
1	A	1500
2	B	1450
...	C	1350
10	D	950

Classification by Participation		
position	name	participation
1	D	4
2	E	3
...	B	3
10	F	2

Classification by Tasks Completed		
position	name	tasks
1	G	12
2	A	11
...	H	10
10	I	7

Table 5 - Exemplifying Leaderboards
Source: Prepared by the authors (2020).

In their planning, the Badges must be organized into categories that bring meaning to both practical and emotional experience desired for the students and for the intended goals with the gamification (KAPP, 2012). Badges can also be used as a way to value extra tasks and activities (participation in research and events) and caring for well-being and health (encouraging adherence to campaigns such as pink October, blue November, blood donation, etc.). Table 6 suggests a list of badges, containing the name, purpose, category and rule for their award.

Name	Objective	Category	Rule
Grade 10	encourage high grades	goal setting	score 10 on the test
Scientist	encourage participation in the science fair	instructional	participate as an exhibitor
Mediator	encourage forum use	reputation	answer 5 questions on the forum
Brave	encourage forum use	status and affirmation	write 1 question on the forum
Super Colleague	identify leaders	group identification	be the most voted of the week
100% up to date	encourage submission of tasks on time	goal setting	all tasks sent by the date of the practice test
Pink October	women´s health care	instructional	participate in a seminar or other activity related to women's health
Youtuber	encourage content production by students	reputation	create a video explaining an exercise
Study group	encourage studying in groups	status and affirmation	be part of a study group

Table 6 - Exemplifying Badge Mechanics
Source: Prepared by the authors (2020).

During the practice of gamification, unexpected situations can arise as well as a highly condemned element in games - cheating. According to Zichermann; Cunningham (2011) everyone tries to somehow circumvent the rules of the game and take advantage of possible flaws in planning, in "a constant state of evolution between the cheater and the system designer" (ZICHERMANN; CUNNINGHAM, 2011, p. 72). One of the risks of gamification is that winning the game may become the goal of the gamer, rather than playing the game. Then, gamers can look for loopholes to play in the system (BURKE, 2016, p. 80).

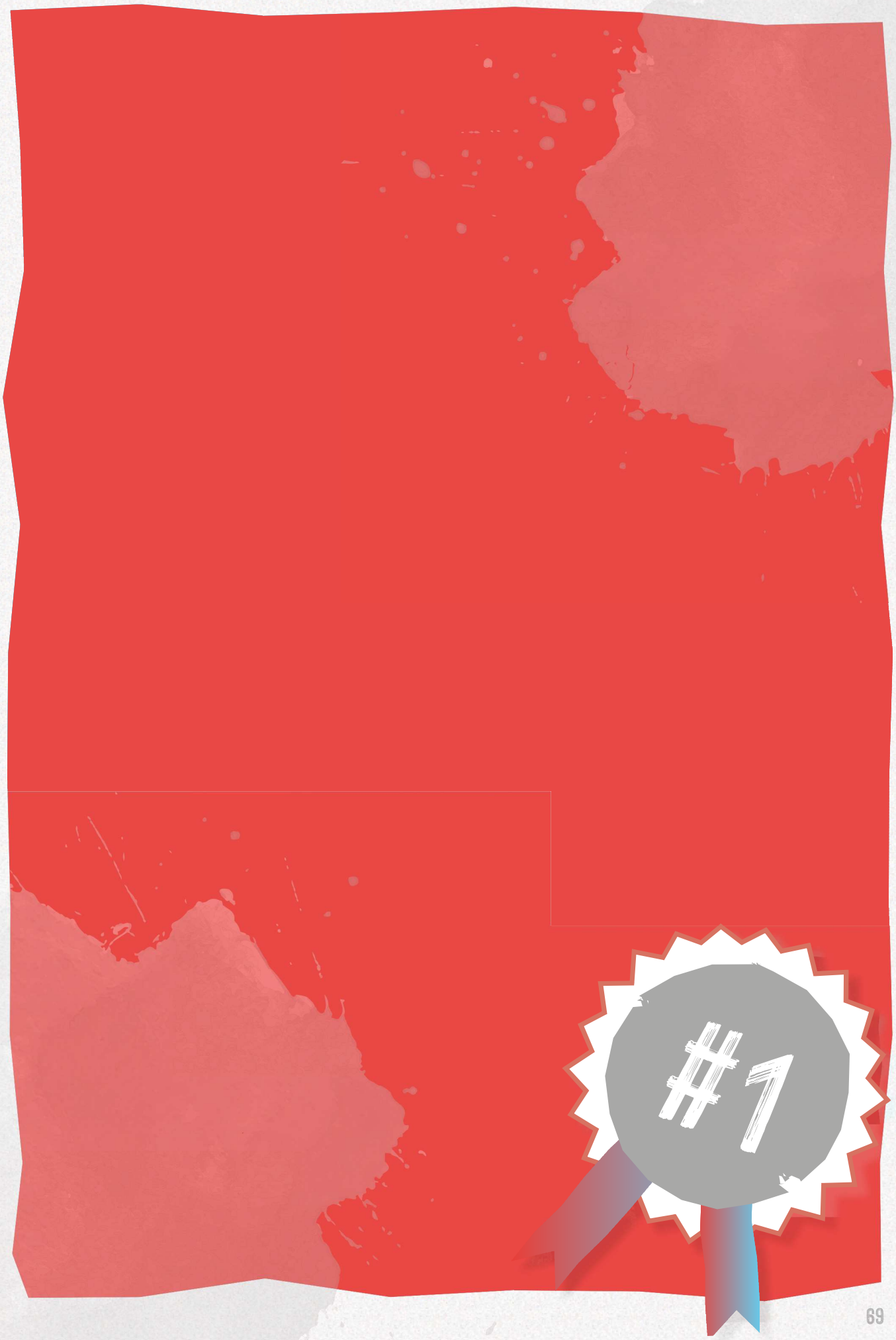
In these situations, badges can be used to remedy some of them. For example, if during the assessment of the use of gamification the competitiveness among the participants goes beyond the desirable, new badges can be offered that encourage team activity and collaboration between participants. In this way, an eventual failure in planning is repairedwithout discouraging participants with new rules or with the withdrawal of already assigned scores. Thus, gamification remains active, moving towards pedagogical objectives.

LEVEL CHALLENGE: PUTTING YOUR GAMIFICATION INTO PRACTICE

It is now a matter of creating the functional structure to support gamification and being able to put it into practice. Use the PLEA developed in the previous challenge or use Figure 5 - Example of the description of the pedagogical structure for adiscipline- to create a description of your pedagogical structure and put your planning into practice. Use the Power Cards we produced to assemble your magic toolbox. Then, add elements, mechanics, dynamics, and behaviors as your studies and practices advance. Do not forget to save the generated documents, as they are part of your portfolio.

The book's website[4] contains blank canvas versions of the PLEA adapted as a teaching tool in the context of gamification with space for the activity, as well as spreadsheets and other documents that can support your gamification.

[4]- https://mpie.poa.ifrs.edu.br/livros/magicalbookofgamification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LEVEL 08

THE END AND THE NEW BEGINNING

This book sought to propose, in a practical way, a guide for the first steps in the use of gamification. From the presentation of basic concepts that support the use of game elements, especially in teaching-learning projects, gamification can be introduced gradually in order to promote behaviors such as engagement, motivation, and self-regulation of learning.

As each individual relates differently to the multiple elements presented, the decision to make use of gamification in the classroom is not a trivial task. Thus, proper planning is essential for the success of a gamification project. In the execution phase, it is necessary to evaluate these executions, enabling the successive and continuous refinement of this planning process. Such an effort is not going to go unnoticed by the students, being transformed intomotivation, even if the initial attempts present problems.

FINAL CHALLENGE: LIFELONG LEARNING

Investing in learning can meet the needs of students, transcending the mere reception of content and providing opportunities for development of skills so that they can learn autonomously throughout their lives (AVILA et al, 2016).

In the information society in which we move, more than recording a lot of information, the most important thing is knowing how to search, select, and decide what is important among the amount and diversity of available information (ROSÁRIO et al. 2000). Advances in information technology challenge society to find new ways of acting to innovate and modify the organization of environments and work spaces (FRISON et al, 2009), which brings "challenges to the educational process for both those who teach and those who learn" (AVILA et al, 2016, p. 64), in which learning and innovation skills are progressively recognized as a way to distinguish whether or not students are prepared for an increasingly complex life and work environment in the 21st century (TAROUCO, 2013). As a final challenge, we invite readers to learn more about the Professional Master's Program in Education Informatics at the Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Sul (MPIE/IFRS), through its page and other publications. Access the link or use the QR-Code below to get additional materials and examples, and you can also answer a Quiz about this book and contact the authors. Also, enjoy your visit to the site and discover the secrets of the enchantments that were part of the elements that compose the gamification structure of the book.

This guide briefly introduces important concepts of gamification and learning self-regulation. The theoretical basis for the preparation of this guide and other important references can be found in the master's thesis "MAAGICA - Model for Self-Regulation of Learning and Intentional Gamification of Contents and Activities", authored by Marcio Fabiano de Carvalho, heldin the Professional Master's Program in Education Informatics from the Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Sul (MPIE/IFRS).

The Magical Book of Gamification.

https://mpie.poa.ifrs.edu.br/livros/magicalbookofgamification

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