

Designing a Player-Persona for Gamification Learning Experiences

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Abstract. The Player-Persona represents a variant of the user persona that includes gamification elements, such as Bartle's player types or company culture. This type of persona is used both in the gaming industry and in gamification designs. The player persona is an imaginary representation that facilitates the definition of gamification objectives based on the type of player, their behaviors, tastes, work culture, etc. With the player-persona technique, powerful and effective gamified learning experiences can be designed, and personalized content can be delivered based on the needs and background of each player. The objective of this research focuses on presenting a process of designing player profiles using gamification as an educational approach to promote intrinsic motivation for the achievement of pedagogical objectives.

Keywords: Gamification, Player-Persona, Learning Activity, Game-design

1 Introduction

The COVID-19 pandemic brought a series of challenges to universities, and mainly to professors. Professors had to find strategies to move their face-to-face activities to the online modality. One of the main challenges faced by professors in this transition is how to create pedagogical designs called learning experiences that invite students to make sense of the academic content taught in these new online modalities. The teacher must be an active agent in maintaining students' motivation for learning and skill development. Therefore, it is necessary that the teacher can design learning experiences that are able to maintain the motivation of students for their own learning. Thus, one of the approaches that is becoming more and more relevant to achieve these objectives is Gamification.

Gamification has had a positive impact when there is a pedagogical design that supports gamification, and it has been shown to promote various skills in learners[1]. Gamification was first used to describe a game-like interface that would make business transactions fast and fun [2], [3].

Several authors define gamification as the use of mechanics, aesthetics and game thinking to engage people, motivate action, promote learning and solve problems. Other authors also add that gamification integrates game elements into non-game contexts. The benefits of gamification include an improved learning experience and environment, instant feedback, behavioral change, and the ability to be applied to most learning needs. By integrating game elements and reward mechanisms as part of a learning experience, gamification motivates and engages learners, and promotes healthy competition. Learners learn a concept and practice skills as if they were playing a game.

Although its use is widespread in many contexts, in the educational environment it still presents some challenges for its application. The main challenge for integrating gamification into the design of online learning experiences is to identify the goals, pain points, motivations and behaviors of students. In this sense, an indispensable technique to be able to create effective gamification environments is the use of player-persona. The Player Persona represents a variant of the user persona that includes gamification elements, such as player types or company culture. This type of persona is used both in the gaming industry and in gamification design.

Therefore, this paper presents the use of a process to design a player profile that facilitates the teacher to design gamified learning experiences in online modalities. Likewise, a practical case of how to implement the process of designing gamified learning experiences based on the player-persona for the development of programming logic competencies in undergraduate students is presented.

2 Literature Review

2.1 Gamification

To support and structure the gamification design process, different approaches have emerged from practitioners and researchers, both in HCI and gamification. Over the years, gamification has been increasingly used to deliver fun and engaging experiences [4].

Gamification is usually defined as the application of game elements and mechanics to non-game activities, in order to improve people's engagement, and motivation, and therefore get better results [5], [6].

[3] Defines gamification as "using of game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning and solve problems". Through numerous afterward studies, the simplest and most widely-used definition of gamification is "the use of game elements in non-game contexts". According to Kiryakova, Angelova & Yordanova, to identify gamification, the key elements that we should be looking for include [7]:

- *users* are all participants – employees or clients (for companies), students (for educational institutions),
- *challenges/tasks* that users perform and progress towards defined objectives,

- *points* that are accumulated as a result of executing tasks,
- *levels* which users pass depending on the points,
- *badges* which serve as rewards for completing actions,
- *ranking* of users according to their achievements. Adapted from [8]

The benefits of gamification include better learning experience and environment, instant feedback, prompting behavioral change, and the possibility to be applied for most learning needs [9].

By integrating game elements and reward mechanisms as part of a learning experience, gamification motivates and engages learners, and promotes healthy competition. Students learn a concept and practice skills as if they were playing a game [10].

2.2 Player-Centred Design

In the world of product and service design, user experiences are created to improve the relationship with brands.

A user persona is a representation of the goals and behavior of a hypothetical group of users. In most cases, personas are synthesized from data collected from user interviews. For each product, more than one persona is usually created, but one of them should always be the primary design goal.

According to The Interaction Design Foundation: “The **Player Persona** is similar to a user persona (which most UX researchers will be intimately familiar with), but it also examines some gamification-specific elements which would not otherwise exist in a standard user persona”. On the other hand, according to [11] Play-Personas are the models of players created from the evaluation of real users playing experiences. For the construction of a play-persona, players are observed and patterns are identified in terms of player navigation and their interaction with the game mechanics [12].

The Player Persona can be used both in projects for the gaming industry and in Gamification projects.

3 Related Works

The competitiveness of the video game market has increased the need for understanding players.

In the work of [13], the authors generated player personas from survey data on the 195,158 gambling preferences reported by 15,402 gamblers, using the automatic persona generation methodology. The purpose of the study is to demonstrate the potential of data-driven personas to segment gamers according to their gaming preferences. The prototypes of personas obtained by the authors have potential value for game marketing, for example, for targeting gamers with social media advertising, although they can also be used to understand demographic variation among different gaming preference patterns.

Another application approach of using player-person is as a tool to train spatial skills. [14] conducted a study as 350 participants to learn the game preferences of students with poor spatial skills. Study participants took a timed test of spatial skills and then answered questions about demographics, gaming habits, preferences, and motivations. The results obtained provided design recommendations for game-based, spatially targeted, spatial skill interventions for students with low spatial ability. With the results obtained, a regression analysis was performed to identify the subset of the sample with the lowest spatial skills and to characterize their play habits and preferences, to develop a set of recommendations for designers of spatial skills training games.

3 Player-Persona Design Process

When introducing gamification, it is recommended to go beyond the basics to understand the player's personality. This will provide insight into how to motivate him or her through gamification. When introducing gamification, it is recommended to go beyond the basics to understand the player's personality. This will provide insight into how to motivate him or her through gamification. In this regard, a process for designing player profiles (see figure 1) is presented that starts with identifying learning needs and gathering information to design the best gamification strategy. This process can be a starting point and can be modified according to your needs.

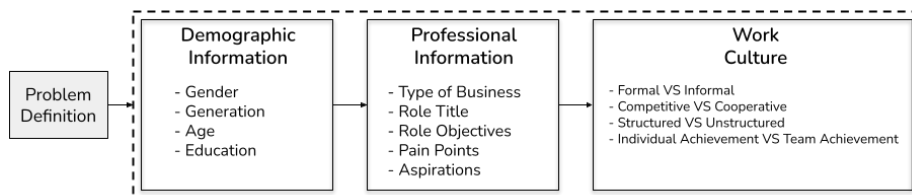


Fig. 1. Player-Persona Design Process – knowing the player. Adapted from [15].

Problem Definition. Defining the problem is about identifying situations that can be improved. Similarly, it is not enough to detect the problem; it must be stated correctly in order to provide a solution. To think about solution actions, it is important to analyze the teaching-learning processes.

Demographic Information. The demographic data relate to aspects of players' multifaceted personalities and provide fundamental information on how they can be attracted and motivated in an educational context.

Professional Information. The context of the school and the professional information of the actors consists of the following aspects:

- *Type of business:* In the context of educational software, it refers to the educational level that the software targets.
- *Role Title:* The role is an important part of a person's professional identity, both internal and external to the school environment.
- *Role Objectives:* To truly understand the nature of the job, it is not sufficient to simply note the job title; it is needed to look into the details of the job goals.
- *Pain Points:* Identifying user pain points uncovers design opportunities. Incorporating these pain points into the player's persona can inspire the team to find creative solutions or to incentivize the player through gamification.
- *Aspirations:* Aspirations, in the school context, could refer to the career and educational aspirations of the players, or to the wish list for the product.
- *Individual Achievement vs Team Achievement:* The culture of the player's environment has a major impact on the success of gamification. Does the culture emphasize harmony over competition? or does the culture reward individual achievement over group achievement? These are very important aspects to consider when designing game mechanics.

Work Culture. An effective educational gamification strategy must be based on a solid understanding of work culture. Work culture has the following aspects:

- *Formal vs Informal:* A mathematics subject can be more formal than an arts subject. A basic education school is more informal than a university. This information is useful for designing the general tone of gamification activities.
- *Competitive vs Cooperative:* Interestingly, competition is not always motivating for all types of players. Cooperation and collaboration may be more motivating in some subjects. Understanding the player's response to competition provides valuable information for selecting the appropriate gamification strategy.
- *Structured vs Unstructured:* Some school cultures are more structured than others. While some may provide strict guidance to their students about their

assignments and responsibilities, other school environments may hold them accountable for the outcome of a given subject and allow students more freedom over assignments.

4 Methodology

In order to carry out this study, a qualitative research was conducted and an exploratory analysis was carried out using in-depth interviews according to Kumar & Herger's methodology [15].

Participants. The sample consisted of four participants, two of them were high school students, and the other two were undergraduate students. The 4 participants belonged to a subject that is related to learning programming logic. All 4 participants belonged to the female gender.

Instrument. An in-depth interview was designed for the study. Through the analysis of qualitative data from the results of the in-depth interviews it will be possible to define the player-persona. Demographic Information, Professional Information and Work Culture.

Procedure. For the data collection process, interviews were conducted through the Zoom platform, due to the COVID-19 pandemic situation. The interviews were recorded to transcribe the comments of the interviewees and facilitate the qualitative analysis.

Data analysis. The analysis of the qualitative data consisted of identifying categories and codes based on the constructs to find relevant information to design the player-persona. The stages followed for the data analysis were:

- *Simple analysis.* The 4 interviews were analyzed separately to form a first block of categories and codes based on the constructs of professional information and work culture related to gender and educational level. This type of analysis allowed us to identify some insights such as pain points that student who are taking a subject have about learning programming logic.
- *Axial analysis.* Axial analysis consisted of taking the categories resulting from the simple analysis and cross-checking the four comments of each interviewee. This analysis made it possible to identify new emerging categories and eliminate others. In this analysis, insights were obtained that were mainly associated with the work culture.

4.1 Player-Persona Result

The qualitative data analysis allowed us to identify the goals, pain points and aspirations that participants commented on in the in-depth interviews, as shown in Table 1.

Table 1. Player-Persona Insights

| Category | High school students | Undergraduate students |
|-------------|--|--|
| Goals | They want to learn how to use technology more efficiently to accomplish their assignments in other subjects. | They want to acquire skills that will help them get a job immediately after finishing college. |
| Pain Points | Supporting materials are difficult to consult | The teacher does not consider prior learning. The exercises are too complex |
| Aspirations | Better use of technology | Finding a good job |

As can be seen in Table 1, the perceptions of a high school student are very different from those of an undergraduate student. High school students express the need to master technologies for educational purposes, while undergraduate students wish to obtain technological competencies for professional work. From the point of view of ways of learning, a high school student considers that the out-of-class materials are complicated to do autonomous study. On the other hand, undergraduate students consider that teachers do not consider previous skills and knowledge in programming logic to establish a starting point.

The first step in the player centered design approach is to understand the player and his/her context. An effective educational gamification strategy must be based on a solid understanding of work culture. The work culture has the following aspects according to Table 2.

Table 2. Work Culture Insights

| Category | High school students | Undergraduate students |
|--|------------------------|------------------------|
| Formal vs Informal | Informal | Formal |
| Competitive vs Cooperative | Competitive | Cooperative |
| Structured vs Unstructured | Structured | Structured |
| Individual Achievement vs Team Achievement | Individual Achievement | Individual Achievement |

Based on the results of the work culture analysis, the most relevant data to highlight is that high school students prefer a more relaxed (informal) work environment and when performing practice activities or evaluations, they like to compete to get the highest grade. The undergraduate students expressed that a more formal and structured environment fosters learning programming, however, they consider that at the bachelor's level, it is necessary to be more cooperative to foster learning.

After realizing and reflecting on the results obtained, it can be established that one player-persona profile does not cover the needs and motivations of high school and undergraduate students. So, to create gamification projects it will be necessary to

define a player-persona for high school students and another player-persona for undergraduate students.

Based on the results obtained, a player-persona has been designed for a profile of an undergraduate student, as shown in Figure 2.

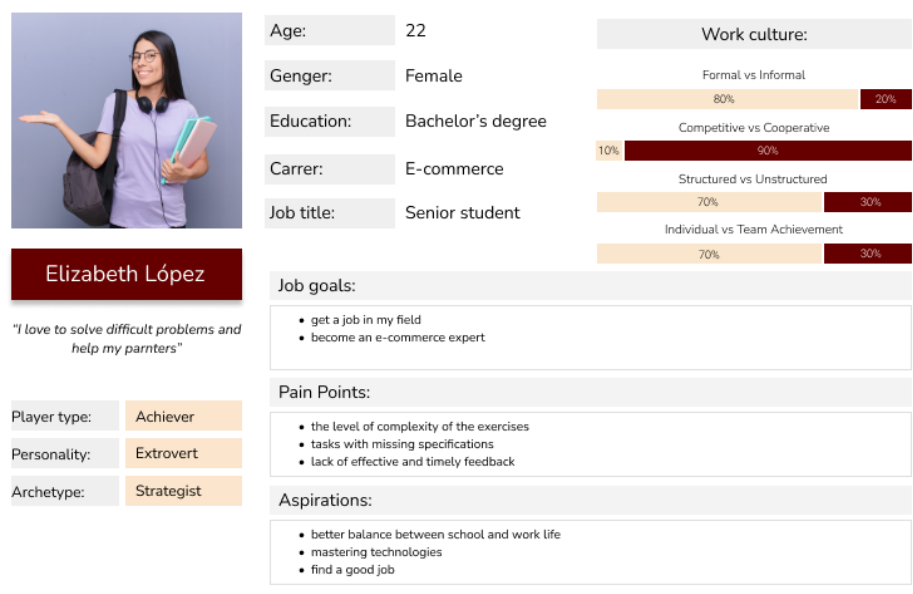


Fig. 2. Player-Persona of undergraduate student.

5 Case Study

In order to describe the implementation of the player-persona in a gamification activity, a case study on the development of programming logic skills for high school students is shown.

The purpose of the Programming Logic workshop is to understand the use of flowchart symbols as a tool for solving computational problems.

5.1 Defining the Dynamics.

The dynamics of gamification consists of designing a workshop for learning flowchart symbols at three levels: sequential structures, conditional structures, and iterative structures.

The learning objective of the dynamics is for participants to develop computational thinking by identifying the inputs, processes and outputs that solve a problem at the computational level.

The participant will start with a beginner avatar, where he/she will have to complete the proposed challenges to understand the flowchart symbols. Subsequently, the participant will unlock the challenges to learn the different logical structures. During the challenges, participants can solve them individually or in groups (clans).

5.2 Defining the Activities.

The dynamics of gamification consists of designing a workshop for learning flowchart symbols at three levels: sequential structures, conditional structures, and iterative structures.

To achieve the implementation of the designed dynamics, three levels of activities that users must complete have been defined:

- Level 1: Sequential Structure, corresponding to a beginner user level.
- Level 2: Conditional Structures, corresponding to an intermediate user level.
- Level 3: Iterative Structures, corresponding to an advanced user level.

Levels 2 and 3 remain locked until the participant completes all the challenges of the previous levels.

5.3 Motivation

To increase user motivation, a system of rules and challenges has been established based on the culture of working in a structured, cooperative approach, but with a sense of individual achievement.

Challenges: For level 1, 2 challenges have been established and are described below:

- *Challenge 1:* Order the steps to build a flowchart to prepare a sandwich.
- *Challenge 2:* Identify the inputs, processes, and outputs to build a flowchart to buy a book on Amazon.

Structural rules: For challenge 1, the student has visual support by describing the symbols and rules of use to build the flowchart.

Action Flow Rules: For the construction of the flowchart, users can perform the activity individually, or they can form teams (clans) to solve the challenges.

5.4 Feedback

A help system for users has been established. In each of the challenges, a button will be available that has the function of providing feedback to the user.

The feedback system can show the description of the flowchart symbols, and the rules for constructing a diagram. However, with this type of help, the system subtracts points from the rewards obtained so far. The system can offer some hints for ordering the flowcharts.

5.5 The Mechanics

Based on the player-persona profile, game mechanics have been analyzed and defined to achieve the learning objectives.

One of the mechanics established for gamified learning activities is the design of a scoring scheme that is established based on the rewards obtained by solving the challenges posed, from an individual achievement approach.

Scoring scheme (rewards). The scoring scheme is a fundamental element to keep the user engaged with the game mechanics and increase their motivation to reach the challenge objectives. To unlock more advanced challenges, users must earn certain points, which are earned as a reward for solving a challenge using the fewest steps to design a flowchart. The scoring scheme can show an overall position of the status achieved by an individual. The status scheme is also a key factor to consider when it comes to increasing the motivation of individuals.

Reinforcement and punishment mechanics. To reinforce the learning of the individuals, at the end of each challenge a round of questions is asked so that the individuals reinforce the learning obtained and really develop the competencies defined in the dynamics section: develop competencies in the use of flowcharts as tools to solve problems of daily life. Some of the questions are: What type of structures did you use to solve the problem? What was the process used?

6 Conclusions

With the COVID-19 pandemic situation, universities had to adapt their face-to-face schemes to distance or online modalities. However, this situation revealed that some professors do not have the technological and pedagogical skills to transform their traditional teaching practice to an online modality.

One of the challenges faced by the teacher is to create pedagogical designs based on the use of technologies and that also invite students to make sense of the academic content taught within the learning experiences. Thus, teachers must increase their educational vision, not only must they be concerned with the strategies they will use to increase knowledge acquisition, but also with how they will promote the development of additional skills that cannot be easily developed in distance models. In other words, the main challenge of the teacher in a pandemic situation focuses on how to maintain the students' motivation for their own learning.

This is how gamification becomes a relatively innovative approach to solve some of the challenges that the pandemic has brought in the educational context. It is vital that in a post-pandemic future one of the core competencies of the teacher is to be able to convert traditional learning experiences into gamified environments to reinforce students' motivation and attitudes towards their own interest in achieving meaningful learning.

This paper presented a process that can guide the teacher to design a player-persona profile as a fundamental basis for transforming a traditional learning

experience into a gamified environment that facilitates the development of the skills required by students in a given subject.

The post-pandemic situation will require teachers to increasingly integrate new innovative strategies to keep students motivated to learn, and gamification will be a useful tool to meet the new challenges.

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