Gamification Journey: A Novel Approach for Classifying Gamer Types for Gamified Educational Systems

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Abstract—**Gamification applied to education studies are often related to the student's motivation and performance in specific tasks. However, what stimulates one student does not always have the same result with another one. Thus, some methods were developed to group and identify gamification users preferences, called "gamer types". By identifying the "gamer type" of a user, it is possible to tailor a gamified educational system (GES) to achieve better results. This approach, however, has some limitations, such as the fact that these classifications are based on the behavioral profiles of gamers and that, in order to identify the profile, the process is relatively complex and time-consuming. This paper proposes a new approach in the identification of student' profiles for use in a GES, using Jung's 12 universal archetypes, concepts of the Peirce's Triadic Semiosis, and the Campbell's Hero's Journey. We address these concepts and how it was related in the design process of avatar creation interfaces for a GES focused on the game elements of narrative and storytelling.**

Keywords-**gamification, archetypes, semiotic, monomyth, educational design**

I. INTRODUCTION

Games became part of our routine, evolving fast since its emergence and being found in many areas (including education) with different purposes, deviating from being just simple entertainment systems [1]. In education domains, games have been widely used as a way to engage students and improve the learning process through serious games [2].

The studies on this field brought the emergence of gamification as the process of using game elements outside their main context, aiming at engaging and motivating students in the learning process, as well as improving their experience [3]–[5]. Gamification in education has been widely explored since its emergence, culminating in the development of frameworks to support its planning and deployment [6], [7]. While these frameworks are important to provide guidelines and steps to support the gamification design, the lack of frameworks focused on how to design and apply gamification for education is problematic for this domain. Furthermore, most of these frameworks focus at providing a *one-fits-all* gamification approach containing specific game elements in very different contexts [7]–[9].

Recent research has shown that using gamification may increase the student's motivation, but it can also decrease their motivation, if the student is not interested in the elements being used, or if the gamification design was not well planned [9], [10]. There are studies affirming that people are motivated or demotivated by different game elements according to their "gamer type" [11]–[14]. This need for personalisation comes from human diversity, which makes each person have different tastes, coming from cultural aspects, demographic characteristics, psychological and behavioral characteristics [15]. However the process of identifying the correct "gamer type" is not intuitive and can be intrusive and time-consuming. This may hinder the student's initial motivation to even begin a task.

To address this gap, this paper aims to answer the following research question: **"How can we identify a student's user preference in an educational gamified system in a subtle and fast way?"**. For that we propose an original approach for identifying a gamified educational system (GES) user's preference in a broader and intuitive way. We did not work with the gamer type approach, instead we worked with the 12 Jungian archetypes [16] in order to create an avatar for the student, who would be their representation in an educational system. The student should choose from a series of pictures related to emotional states and personal preferences, and according to their choices the system would present a given avatar based on one of the 12 Jungian archetypes. From this point on, the GES would present the educational content tailored to that initial preference, using the game elements of narrative and storytelling to guide the student in a 'journey for knowledge', based on Campbell's Hero Journey [17].

Jung's archetypes are universal and are used in psychology [16], marketing [18], education [19], design [20], anthropology [17] and social sciences [21]. Their classification is extensive and complex, but by using Peirce's Triadic Semiosis theory and based on Santaella's adaptation of it in Matrices of Language and Thought [22], we broke each archetype in keywords and abstract concepts related to the Firstness and Secondness perceptions. These concepts were used to collect and categorise pictures that should evoke these characteristics. Our tests have demonstrated that this approach is coherent and robust and can be easily replicated in other contexts.

The next section provides the base concepts and the following discusses related works. Then we present the development process of the approach, followed by the dis-

cussion, and the final remarks, with the possible threads and limitations, as well as the conclusion and future works.

II. Background

This section details the three main concepts used on this study: The 12 Jungian's Archetypes, The Hero's Journey and Peirce's Triadic Semiosis.

According to researches [23] based on Jung's original studies [16], there are 12 primary archetypes that represent the range of basic human motivations, and each person tends to have one main archetype that dominates their personality. This is part of Jung's classic psychology theory of the human psyche and postulates that these 12 universal and mythic characters archetypes reside within the collective unconscious [16]. These archetypes are briefly summarised as follows:

1) **The Innocent:** characterized by people with positive outlook and happy personalities, who often try to see the good in the world and looks for the silver lining in every situation. Their goal can be summarized as being happy, and they usually fear being punished for doing something wrong. They are too trusting of others, but are people of faith and open-mindedness.

2) **The Sage:** values ideas above all else. They use wisdom and intelligence in order to understand the world and teach others. They fear being ignorant and can take too much time to come to a decision if they think they do not have enough information. People of The Sage are intelligent, curious and carries great wisdom.

3) **The Explorer:** seek to experience as much of life as possible, fearing getting trapped or being forced to a daily boring routine. They often have a hard time to compromise, but are true to themselves.

4) **The Outlaw:** people who want to overturn what they think is not working. They often fear being powerless and can become obsessed with their own ideals, but they have great ideas and are good inspiring people to join in their tasks.

5) **The Magician:** seek to understand the fundamental meaning of the universe, having a true belief in their ideas. They usually see things in a completely different way to other archetypes and use these perceptions to bring transformative ideas and philosophies to the world. However they can become manipulative or egoistical, and they fear unwanted negative consequences for their actions.

6) **The Hero:** They often believe they have a destiny or a mission they must accomplish. Their main objective is to help others and protect the weak, but they fear being perceived as frightened. They can be arrogant, but also competent and courageous.

7) **The Lover:** seek harmony in life, aiming to be in a relationship with people, work or environment they love. They fear being unwanted or unloved, and they desire to please others can risk them losing their own identity. But they are social people, passionate and diplomatic.

8) **The Jester:** seek to lighten up the world and make others have fun. They fear being perceived as boring by others, and are often frivolous, wasting time and hiding emotions beneath a humorous disguise. But they can see the funny side of everything and are masters of using humor for positive changes.

9) **The Everyman:** dependable and realists, and search for belonging in the world, usually joining many groups and communities in order to find a place they can fit in. Their main goal is to belong (in a broader sense), and they can fear being left out. They are often cynical but also honest and open, pragmatic and realistic.

10) **The Caregiver:** emphatic and compassionate. They fear being considered selfish and seek to help others most of their time. Because of that, they can be exploited by others because of their compassion and generosity.

11) **The Ruler:** seek to create a prosperous community, fearing the chaos and being undermined. They can be authoritarian but also great leaders, bearing a fair share of responsibilities for the others.

12) **The Creator:** create things of enduring value. They fear failing to create something that lasts and are perfectionist people, which often leads them to creative blocks caused by their fear of not being exceptional. Their greatest strength is their creativity and imagination.

These archetypes are also guided by four cardinal orientations, with each group containing three types [16]. These orientations help in understanding one's personality through the lens of the 12 main archetypes, serving as a broader grouping. Each orientation has three archetypes within its group, where the middle archetype has the strongest orientation and the archetypes to its left and right are inside that group but a little more distant from the full orientation. As an example: The Outlaw archetype values much more freedom than the archetypes of the Jester (who is inside the Freedom orientation, but hangs over to the Social orientation) and the Explorer (who is also inside the Freedom orientation, but prizes for the Ego orientation), and so on, as demonstrated by the cardinal wheel on Figure 1.

Jung's studies were used in many areas, one of them being Marketing (as Brand Archetypes) [18], [23], [24]. This area's researches postulate that there is something about the brands people can connect with, having an affinity with them, many times in an unconscious level. In order to help the brands to understand the collective mind of their audience in creating enduring connections, Mark and Pearson [23]
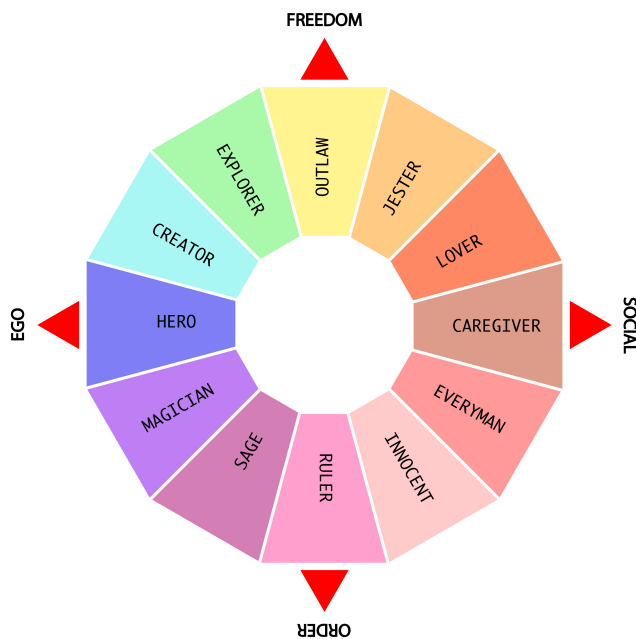
Figure 1.   12 Jung's personalities archetypes diagram [23]

Figure 2.   12 Jung's personalities archetypes human [23]

created a framework. In their model, the 12 archetypes are classified according to four human main drivers: *i)* provide structure, *ii)* spiritual journey, *iii)* leave a mark and *iv)* connect to others, as seen in Figure 2. In their model every person has basic human desires that are instinctive and primitive. Each of his 12 archetypes are then connected to one of these main desires: *i)* The Outlaw wants liberation; *ii)* the Magician seeks power; *iii)* The Hero desires mastery; *iv)* the Lover, intimacy; *v)* the Jester, enjoyment; *vi)* the Everyman wants to belong; *vii)* the Caregiver desires to be of service; *viii)* the Ruler wants to control; *ix)* the Creator seeks innovation; while *x)* the Innocent seeks safety; *xi)* the Sage, understanding and finally *xii)* the Explorer seeks freedom. The archetypes are then divided into broader groups related to the focus of each of these desires. So, people from the archetypes of the Innocent, Sage and Explorer seek an spiritual journey (with different focus); The people from Outlaw, Magician and Hero seek to leave a mark in the world (each with their own way of doing that); people from the Lover, Jester and Everyman wants to connect to others (again, with different reasons and/or focus); and finally, people from the Caregiver, Ruler and Creator (or Artist) seek to provide structure to the world.

In the education domain, Jung's studies were also used since 1978's Mezirow's transformative learning theory, that postulates that the process of perspective transformation has three dimensions *i)* psychological, as in changes in understanding of the self; *ii)* convictional, as in a revision of belief systems and *iii)* behavioral, as in changes in the lifestyle [19], [25]–[27].
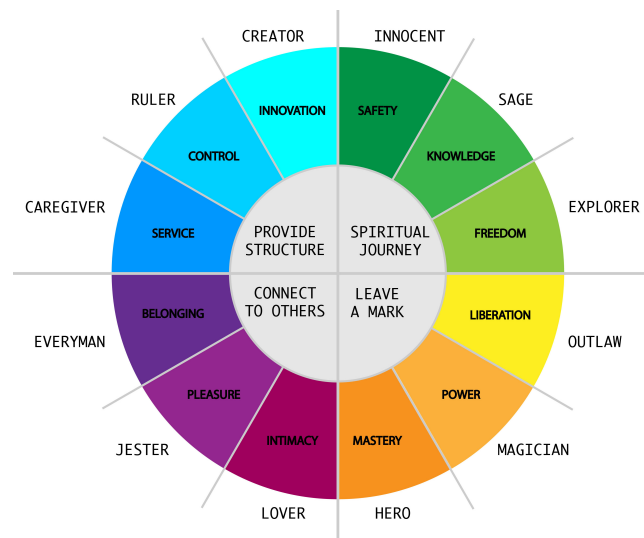
"Transformative learning is the expansion of consciousness through the transformation of basic worldview and specific capacities of the self; transformative learning is facilitated through consciously directed processes such as appreciatively accessing and receiving the symbolic contents of the unconscious and critically analyzing underlying premises [28]".

Based on these archetypes, the monomyth, or the "Hero's Journey", is a template derived from various categories of tales and lore that involves a hero who goes on an adventure, and after dealing with a decisive crisis wins a victory, returning home changed or transformed [17]. Since then, other authors continued studying this universal epic journey, connecting it to a person's daily life struggles, simplifying and signifying Campbell's original 17 steps [21], [29], [30]. Vogler's 12 Steps were developed based on Campbell's study as a script to creating stories (*e.g.* movies, games, comics, books) and is widely used in occidental cinema [21]. For this research, we chose to work with Vogler's 12 steps as it is actually one of the most used and accepted templates in stories creation [31], [32]. Although it is not directly related to the stage of the work described in this paper (*i.e.* the avatars creation based on Jung's archetypes), it is important to establish this relationship at this time, as the fact that our decision to use the Hero's Journey in the presentation of the learning content in the future stages of the work is directly related to the choice of the archetypes at this moment. Because it was based, among other things, on Jung's archetypes, the Hero's Journey becomes a very relevant storytelling template to work with the chosen avatars.

Finally, to support our proposal of letting the users choose their avatar based on their subconscious personality

archetypes, we worked with Peirce's Triadic Semiosis [33]. To the author, sign is something that has a significance, something that is attributed value, meaning the understanding of something, formed through a physical stimulus that generates understanding, happening only through the relationship built between the "I" and the "other/something". Whenever there is attribution of meaning, there is the formation of a sign. Every sign consists of two faces: the sensorial aspect, called *significant* and the understandable aspect, called *meaning*. The harmony between perception and understanding, significant and meaning, results in *significance* [34]. The author classifies the signs in three types: *i)* The icons, that are signs that bear a relation of similarity to what they represent; *ii)* The symbols, that have no relation of similarity or contiguity with the represented thing, being the relation purely conventional. To understand a symbol, it is needed to learn what it means; and *iii)* The indices, that establish an association of one thing or another with an acquired experience.

The triadic theory is related to the way people perceives and interacts with the world, assigning meaning to their perceptions and personal experiences, in a process Peirce called "semiosis", as seen in Figure 3. The Object is the concrete or mental object, while the Representamen constitutes of the signification, the way of representation. Finally the Interpretant is the signified, the meaning a person does of all of it. These three edges defines what is a sign. When the Object and the Representamen are related via similarity we have an icon. When this relationship is by convention, we have a symbol and when it is by factual relation, we have an index. The appearance of a sign is therefore started by the Representamen, which is the trigger for a mental image formed by the Interpretant of the Object, which then becomes the referent of the Representamen sign. However, none of the possible bilateral relations between these elements can produce this specific triadic perspective. For Peirce, a sign can not be decomposed into something more primitive and still retain its meaning [34].

Peirce relates the Firstness to the iconic aspect, the first impression, this being the quality of immediate consciousness as an invisible impression (quality of feeling), un-analysable and fragile. Everything that is immediately present to one's consciousness is all that is in their mind at the present moment. Secondness is related to the indicial aspect, from the point of view of the object, constituting itself in the whole of everyday existence, where it continually comes up against facts considered "external", dealing with obstacles, real and feasible things [33].

According to Santaella, to exist is to be in a relationship, to take a place in the infinite myriad determinations of the universe, to resist and react, to occupy a particular time and space. Wherever there is a phenomenon, there is a quality, that is, its Firstness. But quality is only part of the phenomenon, since in order to exist, quality must be incarnated in matter. The fact of existing (Secondness) lies in this material embodiment. Thus, Secondness is when the subject reads with comprehension and depth of its content [35].

Thirdness is the last concept from the triad and is related to the argumentative or symbolic aspect, that is, the interpretation of the world by a person, corresponding to the layer of "intelligibility," or thought in signs, through which the world is represented and interpreted. [33].
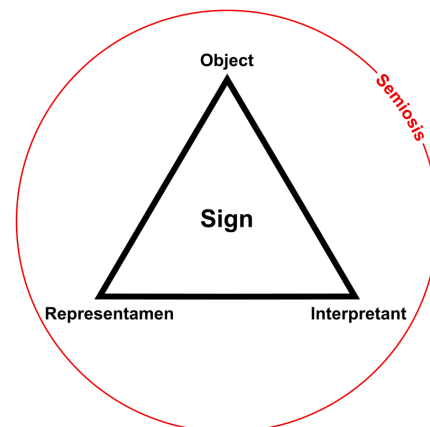

Figure 3.   Peirce's Sign Triad [33]

Based on these concepts and definitions we were able to choose images (as signs) that could better represent Jung's 12 universal archetypes in a unconscious way, helping the users to choose their avatars in an intuitive, not intrusive and fast way, as it is described in details in the next section.

III.   RELATED WORKS

Yee's work identified the correlation between personality traits and the motivations of playing [15], and other researches from the area of personalisation and the "gamer type" approach did the same in different ways [36], such as Bartle's model, which is based on observations of the behavioral characteristics of Multi-User Dungeon (RPG) players [37]; Hexad, a model proposed for use specifically in gamification and that relates the concepts of the Bartle's model with theories of human needs and the experience game design of the author [38]; BrainHex, whose model is based on neurobiological findings that relates players' behavioral characteristics to elements of the nervous system [39] and finally, Yee's own Model, that is based on the motivations of MMORPG (Massive Multiplayer Online Roleplaying Games) players, and also employs concepts from the Bartle model [40].

However, the related work on which this process was inspired was in the interpretation of Peirce's signs by Santaella. Her work assumes that language is formed and processed according to a sign system that resembles the

human way of life. In this way, the language is also subjected to mutations and evolution. To understand how signs are formed and language and meaning combined and mixed, this study establishes three matrices of language and thought: the verbal, which has the property of discourse; the visual; and the sonorous. Each of these matrices have elements categorised in the aspects of Peirce's Firstness, Secondness and Thirdness, in a very similar way to what was done in this work. Every Secondness presupposes a Firstness and every Thirdness the two preceding categories, be they the matrices themselves or their subdivisions. The more we tend to the universe of the Firstness, the more evocative power, because there is less conventionality. The more we move into Thirdness, on the other hand, the less the interpretive possibilities, because there is a code that must be understood in order to determine the object to which the sign refers [22]. This is a purely theoretical research. However we found in it the bases from which categorise the images using the visual matrix and relate them to the user's perceptions, culminating in the avatar's creation.

IV. Development

The purpose of this research was to develop a new approach to the identification of students profiles for use in a GES, relating Jung's 12 universal archetypes, concepts of the Peirce's Triadic Semiosis regarding human perception, and the Campbell's Hero's Journey in the content presentation. The study was designed and executed in five steps following the design thinking methodology as seen in Figure 4 [41]. Next, we describe and introduce how we implemented each step of this methodology:
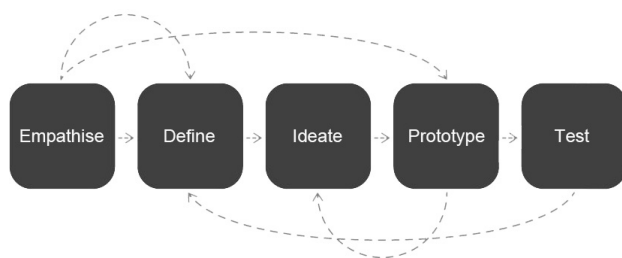

Figure 4. Design Thinking Steps [41]

1) Empathize: The main objective of this step was to understand the problem being worked on, identifying the needs of the target users and the issues surrounding the problem. Our gap was the fact that the existent approaches (such as the "gamer type" ones) for tailoring GES can be intrusive and/or time-consuming (working with materials such as long surveys, for example) and can not address subtle details from a human psyche, being based mostly on studies focusing on gamer's behaviours in certain types of digital games (such as MMO in BrainHex) [39]. As such, we wanted a subtle

and bread approach to identify the users preferences in a GES for the creation of their avatars, and our main objective was to devise an intuitive and fast solution that could be as subtle and broad as possible.

2) Define: In this step we defined a set of pillars we would work with: *i)* Jung's 12 universal archetypes [16] would be our avatars, as they represent and categorise in a detailed way the universal human psyche, intrinsic motivations and view of the external world ; *ii)* Peirce's Triadic Theory [33] for choosing the sequence of images that should be chosen in order to generate the avatar of one of Jung's Archetypes; and *iii)* The Hero's Journey [21] for presenting the educational content to the student.

3) Ideate: The main objective of this step was to propose alternative interfaces to explain and illustrate the potential design space. For that we worked with sketches and wireframes to explore and refine our idea. These concepts were based on Buxton's [42] sketches and prototype differences table, as it can be seen on Table I. We created a couple of sketches (Figure 5 and Figure 6) and wireframes[1] (Figure 7 and Figure 8) looking for these alternatives and decided to prototype the following process: The user would be presented with four initial images, each representing in an abstract way (using the concept of Peirce's Firstness) one of the four human main drivers: provide structure, spiritual journey, leave a mark and connect to others. When this first step is concluded, the interfaces closed the other three images and opens up to 3 new images, directly connected to the previously chosen one. Each of these images represents one of the 12 archetypes, in a subtle way. It is expected that the person chooses these images looking only for what pleases them the most. With the avatar chosen, the user is ready for the next step, the materialization of their sensations (or the Secondness). From now on, during their journey through the content, the user is creating his Thirdness view of the world and the educational content.

Table I
Sketches from Prototypes According to Intent [42]

Sketch	Prototype
Invite	Attend
Suggest	Describe
Explore	Refine
Question	Answer
Propose	Test
Provoke	Resolve
Tentative, non committal	Specific Depiction

[1]The process of wireframing is a way to design interfaces at the structural level and is commonly used to sort content and functionality, taking into account the users perspective. They are used to define the basic structure before visual design and content is finally added [43].
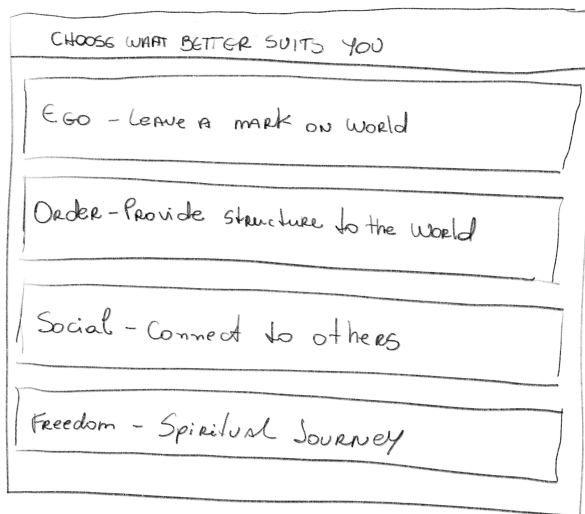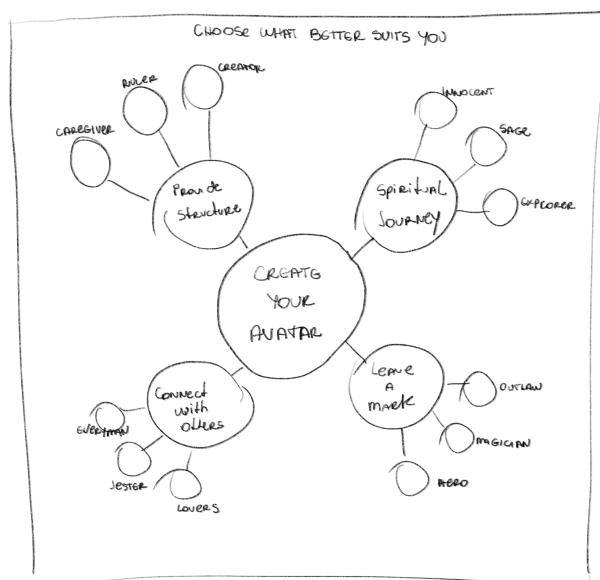
Figure 5. First Interface Sketch

Figure 7. First Interface Wireframe

Figure 6. Final Interface Sketch
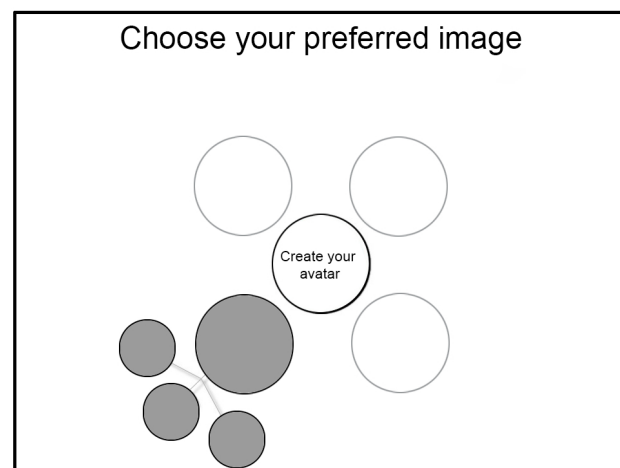
Figure 8. Final Interface Wireframe Choice

4) Prototype and evaluation plans: In this step we created a series of mock-ups for the avatar creation screens, as showed on Figure 9 and Figure 10. After that we carried out the implementation of a horizontal high-fidelity prototype [2] of the idea designed in the previous phases. Our evaluation plan was designed with the use of personas [3] as it can be seen on Table II and Table III.

5) Test: In this part of the study we executed the evaluation of the horizontal high-fidelity prototype [46] implemented, according to the evaluation plan presented in the previous part, using the persona's technique [43]. Four specialists embodied the role of each of the two personas and sought to interact with the images, making sense of them and interacting

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[2] According to Nielsen [44], there are two dimensions of prototypes, the horizontal one that provides a broad view of the entire system or subsystem, focusing on user interaction and low-level system functionality and the horizontal prototype, that is a complete elaboration of a single function or subsystem, being useful to obtain detailed requirements. These dimensions can be of low-fidelity such as wireframes of high-fidelity such as mock-ups.
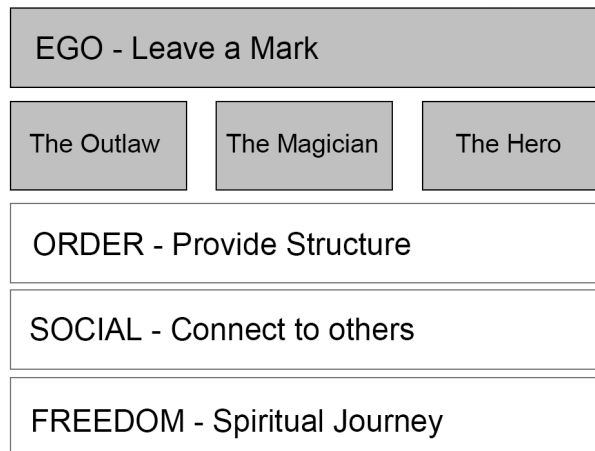
[3] Personas are fictional characters templates, created based on target users to represent the different user types that might use a service, product, software or brand. Their objective is to help the designers understand the user's experiences, needs, behaviours and goals. According to Nielsen [45], they need to be goal-directed, role-based, engaging and fictional.
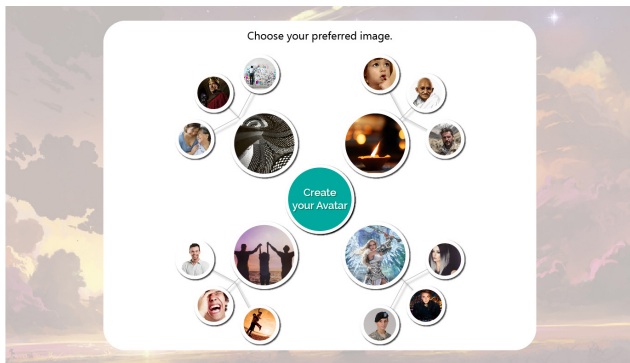
Figure 9.   Avatar creation screen mock up

Figure 10.   Avatar creation result example mock up

Table II
USER PERSONA - HIGHER EDUCATION STUDENT (NON-GAMER)

SOFIA	
Background	- Sophomore at University - Works part-time in a drugstore - Plays in one university sports team
Demographics	- 20 years old - Female - Makes <$800 a month - Lives in the college city in a kitnet - She is the oldest of three children
Identifiers:	- Unruffled demeanor - Charismatic - Always using her phone in Whatsapp - Very busy, have few time for her hobbies

with the prototype. The reports showed that the gamer user persona found the process much easier then the non-gamer persona. However both persona types understood the tasks and did the process easily and quickly, being satisfied at the end, when the avatar was presented.

V. DISCUSSION

From the notion that the significance derived from the Firstness is abstract, internal and primal, and the Secondness is to materialize the Firstness significance through a real action, we sought to map the concepts related to each of

Table III
USER PERSONA - HIGHER EDUCATION STUDENT (GAMER)

CARLOS	
Background	- first year at University - works as a laboratory assistant and receives a funding - plays League of Legends and other online games
Demographics	- 18 years old - Male - Makes <$500 a month - Lives in the university students dormitory - He is an only child
Identifiers:	- Introvert demeanor - Intelligent and is a good student - Always using his phone to play mobile games - Can separate time to study and to his hobbies very well

Jung's archetypes to these two edges of Peirce's triad. At the moment, we did not work with Thirdness because, being a significance that comes from the personal experience of each one, it would be impracticable to represent it through images (Thirdness enters this process through the final significance that the students themselves make of the set of their choices of images, and is subjective to it).

With these concepts mapped, as shown in Table IV, we sought to gather images related to these moments (from free image banks), working with the Firstness in the first choice (of the four basic intrinsic motivations of the archetypes), and the Secondness in the choice of the own archetype. The idea is that the user could choose in a subjective but effective way, what would be the best approach to study from there. However, one of the limitations of it lies in the fact that because one chooses the images simply for the sake of taste and at that moment, it is possible that the chosen avatar is suitable for that very moment, but in another day it does not make as much sense anymore. This is a serious gap that needs to be better worked on in the future. One of the possible solutions for this lies in the use of adaptive systems, for example.

VI. FINAL REMARKS

The present paper described the process to design a tailored GES avatar creation interface. This is part of a larger project where we developed the prototype of the users first contact with a platform like this and then used Human-Computer Interaction evaluation techniques [43], [47], [48] to validate its proof-of-concept. Our results showed that this approach is feasible and can be implemented in GES. However, due to the limitations already mentioned, this system would need to be adaptative in some way for the experience to be maintained with the same success rating.

As future works we intend to map how the educational content should be presented to the student based on their chosen avatar. In order to do that we are going to work

Table IV
THE 12 ARCHETYPES AND THEIR RELATIONS TO THE SIGN TRIAD
(FIRSTNESS AND SECONDNESS)

Archetype	Firstness	Secondness
The Innocent	freedom, happiness and naiveness	aim to do things right and fear doing things wrong
The Sage	wisdom, intelligence and meticulous	aim to find the truth and fear being misled
The Explorer	autonomy, ambition and inner emptiness	aim to experience a fulfilling life and fears conformity
The Outlaw	outrageousness, idealism, radical freedom	aim to overturn what isn't working and fears being powerless
The Magician	make things happen, manipulation, determination	aim to understand the laws of universe and fear negative consequences
The Hero	competence, courage and arrogance	aim to expert mastery in a way that improves the world and fear weakness
The Lover	passion, gratitude, commitment and weak identity	aim to be in a good relationship and fear being alone or unwanted
The Jester	joy, frivolity, playfulness	aim to have a great time and fear being bored
The Everyman	realism, empathy and lack of pretense	aim to belong and fear to be left out
The Caregiver	compassion, generosity and martyrdom	aim to help others and fear ingratitude and selfishness
The Ruler	responsibility, leadership and authoritarism	aim to create a prosperous community and fear chaos
The Creator	creativity, imagination and perfectionism	aim to realise a vision and fear mediocre execution

with the game elements of narrative (*i.e.* "the process in which the user builds his own experience through a given content, exercising their freedom of choice in a given space and period of time, bounded by the system's logic" [49]) and storytelling (*i.e.* the way the story is told, using multimedia resources such as audio, images and texts [49]), based on the Hero's Journey twelve steps [21].

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