Towards personalised, gamified systems: an investigation into game design, personality and player typologies

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ABSTRACT
With the rise of Gamification, the boundaries between play and games on the one hand, and everyday life on the other are being challenged, and as a result game play is entering the realm of everyday life. We believe that with the breakdown of this dichotomy and with the increasing presence of game elements in everyday life in the form of Gamification, there are more factors such as users intrinsic motivation, agenda, learning preferences and personality that should be considered in the design of gamified systems. In this paper, we investigate the relationship between player types, and personality types and traits. By way of investigating pre-existing player type models as well as personality traits and types models, we have identified possible relationships between these two areas of research, and in that, between the realm of games, and the realm of the everyday. As a result, we propose a table identifying these possible relationships between player types, personality types and traits, and game elements and game mechanics and discuss how this connection may impact the design of gamified systems and offer insight towards more user orientated design objectives.

Categories and Subject Descriptors
H.5.2 [User Interfaces]: Theory and Methods; J.4 [Social and Behavioural Sciences]: Psychology, Sociology; K.8.0 [Personal Computing]: Games; D.3.3 [User Interfaces]: User Centred Design

General Terms
Design, Human Factors

Keywords
Game Design, Gamification, Gameful, Personality

1. INTRODUCTION
Researchers have been discussing the relationship [4, 30, 44] between player types [2, 4, 7, 9, 20, 29, 31, 33] and personality [6, 12] for a while. On the one hand, personality can be defined as "a stable core of emotions, dispositions, attitudes, and behaviours that uniquely characterize a person at a specific point in time and shape development across the lifespan" [6]. In other words as individuals, our foundations are made up of various elements that account for how we feel, think, act and behave at any given moment within our lives and influence the development of ourselves as we grow. Many theories and paradigms exist that offer different perspectives of personality such as psychodynamic, psychiatric, existentialism, phenomenology (see: [12]) and so forth. Those that we have found to be dominant in the field for both their presence within the discussion of personality and traits and empirical foundations have become the focus of our investigation.

On the other hand, scholars such as Bartle, Caillois and Fullerton (among others, see: [7, 29, 31, 33]) identify player typologies of games and the characteristics that players exhibit (such as competitiveness, sociability and exploratory behaviours) within games. With play, games and game elements pervading ordinary tasks, it appears that everyday life becomes more “gamified”; and with boundaries evaporating as well as with everyday and game-based activities overlapping, and even merging, we find this is an interesting situation to investigate and examine.

Whilst Gamification is a popular term, the concept is not entirely new [45]. There are various definitions for the concept of Gamification [14, 42, 45]. We define Gamification much like Kapp [26], that is – applying elements and mechanics of games in order to engage a user in a task outside of a game context. In recent years, design researchers like ourselves have come to think of it as a process by which we aim to achieve positive behaviour change outcomes for users we design for. We as designers have sought to promote and sustain learning, motivation and engagement [26] in an enjoyable way by applying game elements and game mechanics to ordinary tasks with much success, however at the risk of compromising our intrinsic motivation [13].

2. BACKGROUND
Attempts have been made to categorise players into what is known as “player types” to synthesise various behaviours exhibited during play. However, with our interaction in games and virtual worlds and with game elements and game mechanics pervading reality, another categorisation of individuals has been developed. Psychologists for example, have identified that player typologies have relationships with that of pre-existing personality types (see: [30, 44]) and that player types are essentially another synthesis of personality. This relationship indicates that player types and personality types are essentially the same synthesisation, just within different contexts. Independent of these
contexts our personalities are reflected in how we interact with virtual worlds as we do in reality.

2.1 Player Types
Between 1989 and 1990 a lengthy debate broke out among users of Multi User Dungeons (MUD) upon online forums to answer Bartle’s question of “what do people want out of a (MUD)[2, 3]?”. A MUD is a real-time virtual world that is based entirely on text and was one of the first online virtual environments allowing people to interact with [2, 3]. As a result of enquiring among users what they found “fun” Bartle discovered from the responses, that players fell into one of four categories – Achiever, Socialiser, Explorer or Killer.

Achievers act ON the world. They typically play to win in games and get a great sense of achievement through defined goals and progressing their character through the worlds built-in ranking system [2].

Socialisers interact WITH players and find the greatest reward in games is with interacting with others in a virtual world.

Explorers interact WITH the world and find great pleasure discovering new areas and gaining new knowledge of their surroundings.

Killers act ON players and find it enjoyable to dominate others either by attacking, killing or make their life hard within the virtual environment.

This player typology was later adapted to three-dimensional environments and featured another four elements in an attempt to account for the fluctuations between player types and to identify further sub-types of the initial four player typology; however the adaptation only explains the latter (see Figure 1).

We acknowledge that there are criticisms over Bartle’s model, (see: [17, 32, 33]) however, Bartle’s player types is one of the most prominent within the areas of player typologies, therefore we feel it is relevant to include as part of this discussion.

In her book Game Design Workshop: A Playcentric Approach to Creating Innovative Games Fullerton outlines different types of players based on the agendas and needs when entering a space of play as well as addressing the pleasures of play from the point of view of the player [20]. Fullerton describes the player types as follows:

The Competitor: Plays to best other players, regardless of the game.

The Explorer: Curious about the world, loves to go adventuring; seeks outside boundaries—physical or mental.

The Collector: Acquires items, trophies, or knowledge; likes to create sets, organize history, etc.

The Achiever: Plays for varying levels of achievement; ladders and levels incentivize the achiever.

The Joker: Doesn’t take the game seriously, they play for the fun of playing; there’s a potential for jokers to annoy serious players, but on the other hand, jokers can make the game more social than competitive.

The Artist: Driven by creativity, creation, and design.

The Director: Loves to be in charge, direct the play.

The Storyteller: Loves to create or live in worlds of fantasy and imagination.

The Performer: Loves to put on a show for others.

Figure 1. Bartle’s Player Types Extended [2]

The Craftsman: Wants to build, craft, engineer, or puzzle things out.

Agôn (competition) are games that evoke competition, require confrontation or conflict.

Alea (chance) is used to characterize games of chance—an element of uncertainty such as rolling a die, flipping a coin.

Mimicry (role playing) requires players to portray the identity of someone or something else.

Ilinx (vertigo) is a category that seeks to alter the perception of someone or something.

Paidha that is free form play.

Ludus, which is rule based/structured play.

The three typologies of players discussed, outline similar characteristics of players and the contexts of which they are present (i.e. competitive atmosphere and role playing). This provides an outline of potential dominant genres and areas of play that feature in games and play.

2.2 Personality
The classification of personality types can be traced as far back as the concept of humourism [12] which promoted the idea that bodily fluid was responsible for producing a particular behaviour. Hippocrates and Galen promoted the notion of biological factors influencing modern day theorist such as Eysenk. As the synthesisisation of behaviours and personality types evolve, so did the list of descriptors used to define them. These descriptors became known as personality traits. “A [personality] trait refers to an inner tendency or predisposition for a person to act in a certain way” [6] and they act as a type of measuring stick,
assessing to what extent a person exhibits or possesses a particular trait. For example, how anxious or how aggressive an individual may be. Unlike personality traits, personality types are a bit more rigid following a categorical structure. An individual can be either/or a particular personality type but consist of many personality traits. For example an individual may be a very creative person but exhibit traits of aggressiveness and anxiety.

There are many prominent theories such as ones by Myer-Briggs, Jung, Freud or The Enneagram [34], and that the subject of personality traits and types in itself is extensive. For the purpose of this paper we have reviewed only a few that appear to have been regularly cited to provide a brief overview in order to identify similarities in relation to player types.

Hans Eysenck observed the earlier work of Hippocrates and Galen, criticising it as being “almost entirely of subjective character” [16] and believed that Hippocrates doctrine “humours” were scientific rubbish. The four humours were four bodily substances: black bile, yellow bile, blood and phlegm, which determined how healthy an individual depending on their balance within an individual. Eysenck was focused on the belief that biological factors influenced our personality and maintained the stance that behavioural differences were surface manifestations of biologically based, genetically determined, and compositional differences in traits. Despite these criticisms of Galen’s and Hippocrates work, Eysenck concluded that personality comprised of three broad “superfactors” that were made of more narrow traits [12]. The first one was Introversion/Extraversion. Introversion involves being drawn to inner experiences and presents a much more reserved individual. Where in contrast, extraversion involves directing attention outwards to others and presents a much more outgoing individual. Secondly, Neuroticism/Emotional Stability is the emotional aspect of an individual. It is there difference between being upset and emotionally constant. Finally, psychoticism of which individuals that present dominance in this dimension, tend to find it difficulty dealing with reality.

In developing the descriptors of what describe an individual’s personality type. Raymond Cattell began with an extensive list of trait names - a total of 4,500 of which he reduced to 171. Through factor analysis he reduced it again to just 16 factors of which now make up the 16PF questionnaire [10]. The 16PF questionnaire features two ends of the spectrum for each of the following 16 traits and individual possesses:

- Warmth (distant/comforting), intellect (instinctive/analytical), emotional stability (irritable/calm), aggressiveness (passive/assertive), liveliness (restrained/unrestrained), dutifulness (untraditional/traditional), social assertiveness (shy/outgoing), sensitivity (tough/soft), paranoia (trusting/suspicious), abstractness (practical/imagination), introversion (open/reserved), anxiety (confident/doubtful), openness (self-sufficient/reliant on others), perfectionism (undisciplined/disciplined), and tension (relaxed/stressed).

It has been proposed that Cattell was the original intellectual father of the big five, but denied any paternal relationship with it [23]. Despite this, the first “big five” category begins with Donald Fiske [23]. Fiske identified five factors through testing research participants with rating scales from Cattell’s work. Later on, the most notable of these five typologies is the Costa and McCrae “Five Factor Model” (FFM).

The Five Factor Model (FFM) consists of “The Big Five” categories that are used to describe human personality. These categories are associated with the acronym OCEAN (coined by John [25]) feature the following: openness (curious/cautious), conscientiousness (organised/careless), extraversion (outgoing/reserved), agreeableness (friendly/unkind), and neuroticism (anxious/calm) [12]. To measure these traits Costa and McCrae developed the NEO Personality Inventory questionnaire [11].

The four different perspectives on personality types and traits present varying aspects of how we can consider identifying and approaching traits within individuals. While this lexicon (see: [1, 15, 21, 36]) may differ between describing characteristics of individuals and varies not only among the perspectives discussed but also more broadly speaking, we can still conclude that there is a broad vocabulary to identify ourselves among a population of many individuals and account for various combinations within individuals. We have only very briefly discussed personality types in order to provide an idea of what constitutes personality types and traits to provide a background for our discussion with player typologies.

3. DISCUSSION

We preserved play and games among everyday life as what Bausinger defines as “little celebrations of the everyday”[5]. In addition to Bausinger’s dichotomy, Turner refers to the concept of it as liminality and liminoid [39]. Liminality is the movement from one previous state into another, a process that is defined by rules and boundaries. In contrast, liminoid is neither here nor there, it is disconnected from the ritual process, where events that occur are elective and free from rules, an existence where we can have “fun”. Similarly to the concept of free and structured environments, Caillois’s play styles – Paida and Ludus - present us again with the dichotomy that Bausinger and Turner outline between that of game and play, and everyday life.

However, with Gamification, pervading everyday life, the boundaries of play and game are being contested and challenged. This is as a result of utilising game elements and game mechanics to engage individuals with everyday tasks. It is now our role as designers, to be better informed and understand what this means in terms of how to conceive these gamified systems. When we play within a game we voluntarily engage with the fantasy world. On the other hand, with gamified systems the line between voluntary and involuntary participation is blurred. For example, when we enter a competition, we do so competing against others, while if we use a gamified fitness application that has a leader board it is part of the design, so whether we chose to compete against others or not is not so much a voluntary choice (besides engaging with the application to begin with) as it is a part of the system. So the question then becomes how do you make involuntary participation more enjoyable and less about behaviour modification with the aim of reducing external rewards to engage in order to promote intrinsic motivation. It is important for designers need to address this issue as well as the agendas and motivations that are behind the reasons for implementing game elements and mechanics into ordinary tasks. Is the agenda to reaffirm beliefs that we already hold, such as validation for doing a particular process, or to drain recourses and invest them into a system i.e. productivity and motivation? For example giving longer work breaks as a reward for harder working employees to as a way to encourage productivity within the workplace.

In pursuit of “fun” [28, 45] one of the main challenges that entertainment designers encounter is trying to incorporate various game elements and mechanics into non game contexts to encourage behaviours such as productivity, weight and exercise...
management (see also: [18]), in order to facilitate an enjoyable experience. However, it has been observed that while these gameful and “fun” systems make an ordinary task more enjoyable and engaging, that may fall into the trap of behaviour modification, providing simple operant conditioning [8, 43]. This typical “Skinner Box” scenario [37] has been criticised and ism if not an inherent problem of incorporating elements to encourage a particular behaviour because users end up becoming so fixated on the reward that their intrinsic motivation decreases [13, 38]. This is an issue that the concept of self-determination theory advocates - the inherent problems occur with a reliance on external rewards [13, 38].

It is assumed that by understanding the relationship between player types, personality types and traits in relation to game elements and game mechanics that more appropriate and meaningful choices can be made for gamified systems. The choice of game elements and game mechanics in relation to more personal attributes, such as that of personality types and traits, of an individual may assist the user in utilising elements that we believe are intrinsically motivating to the player, rather than external rewards and objectives.

Up until now, investigations between player types, and personality types have focused on game genres such as adventure, puzzle and first person shooter (see [30, 44]) with the objective to better identify users of games, some built upon personality psychology theories (see: DGM1 [4]). However, further exploration is required to identify potential relationships between game elements and mechanics and personality types and traits. We believe the focus should be on the potential relationship between personality types and traits and that of game elements and mechanics. This is because game systems consist of elements and mechanics and the concept of Gamification tries to replicate these systems with ordinary tasks. Ultimately it is these game elements and game mechanics that are isolated and chosen to be part of these gamified systems to make ordinary tasks more enjoyable. As a result it seems reasonable to focus on the choice of game elements and mechanics in relation to the personality types and traits of the users that these gamified systems are targeted towards.

To understand users preferences, we believe personality traits are more relevant in comparison to player types due to the dynamic ability and variation. Bartle observed that players often switch between player types yet no explanation has been given as to why this occurred. We hypothesise that the concept of player types is very much built upon personality traits, which are dynamic and change frequently depending on context and environment. This could perhaps explain the reason why Bartle never determined the reason for the fluctuations, as the player typology that identified “player types” is inherently traits of personality.

Outside the discussion between personality and player typologies, there has been investigations into identifying the similarities among the existing player typologies [18, 40, 41] on their own. However, in light of the relationship that we have observed with personality traits and types, we propose a preliminary table (see Table 1) identifying the player types, personality types and traits and suggested game elements and game mechanics that may be associated and enticing to individuals. We developed this table to better identify potential combinations of users and game elements and mechanics to better inform the design of gamified systems.

<table>
<thead>
<tr>
<th>Player Types</th>
<th>Personality Traits</th>
<th>Game Elements/ Mechanics</th>
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</thead>
<tbody>
<tr>
<td>Dominant</td>
<td>High sociability, assertiveness, aggressiveness</td>
<td></td>
</tr>
<tr>
<td>Humanist</td>
<td>Non-assertive, empathetic, cooperative</td>
<td></td>
</tr>
<tr>
<td>Inquisitive</td>
<td>Curious, inquisitive, open to new experiences</td>
<td></td>
</tr>
<tr>
<td>Creative</td>
<td>Creative, imaginative, experimental</td>
<td></td>
</tr>
<tr>
<td>Assertive</td>
<td>Assertive, confident, egotistical</td>
<td></td>
</tr>
<tr>
<td>Dominant</td>
<td>High sociability, assertiveness, aggressiveness</td>
<td></td>
</tr>
</tbody>
</table>

The table is separated into five categories: player types, personality (traits and types), game elements, game mechanics and classification. It should be noted that this is not an attempt to rebrand existing typologies but rather an alternative synthesis in light of the potential relationship between player typologies and personality types, and game elements and mechanics. For the section on player types we categorised similar types as identified by those discussed in this paper as well as others referenced in order to group those that are similar. Next we identified traits that were similar to the player typologies (i.e. high sociability, withdrawn, assertive etc.). In the category of game elements we identified game elements as defined by Schell [35] and Fullerton [20]. We then placed game mechanics, identified by [22, 45].

Finally, the last category - classification we attempted to preliminary name the five categories that were identified by the groupings. The categories and their descriptions are following:

**Dominant** users exhibit a strong need to be visible, whether through sociability, assertiveness, aggressiveness and so forth. We believe that a user who may fall into this category may be confident, egotistical and self-driven. Complementing this type would be mechanics that are self-serving and personally relate to their participation (i.e. badges).

**Objectivist** is someone who seeks to achieve and build upon their knowledge through demonstrating their dexterity and intelligence (i.e. awards, achievements, bonuses, levels). They are not necessarily as selfish as those who fall into the Dominant category, but their focus is on their selves before others.

**Humanists** are more inclined to be social and involve themselves in tasks that rely on social engagement. Their needs are just as important as others and they like to work with others to solve problems rather than on their own. As a result their sense of validation comes from the opinions of those who they are engaging with rather than that of external reinforcements but may benefit from group orientated elements and mechanics such as quests and being part of a guild. They may also be more enticed with customisation to facilitate a dynamic system to cater for various members of the group.

**Inquisitive** users like to explore and investigate new things. They feel a sense of validation through discovery rather than being told what to do and do not necessarily follow processes and structures. They prefer a more natural environment in contrast to a linear and structured one. They are be more inclined to engage with open worlds, be in control and embark on quests to locate particular items.

**Creative** individuals like to create and develop things through utilizing skills that they obtain through experimentation. They like to have structure but have the option to treat it as a guide rather than as instruction. This is only a theoretical framework at this point and thus will require much more investigation and iteration.

4. SUMMARY

We presented various personality types and traits as well as outlined player typologies that currently exist. We posit that there is a relationship between player typologies and personality types and traits. This position to some extent is supported by the literature explored. We assume that this relationship could better inform designers on a deeper level about the type of users that they are designing for. This in conjunction with appropriately identified game elements and mechanics may provide a dynamic toolbox to better inform the design of gamified systems and specifically target users in a more internally engaging and motivating way. We attempted to identify possible relationships.
between player typologies and personality types and traits with that of game elements and mechanics. This table, however, requires further research and validation. From this theoretical analysis we will be continuing our investigation into not only the relationship between player typologies and personality traits and types, but also in relation to game elements and mechanics. Furthermore we would like to see the application of this table into typologies, but also in relation to game elements and mechanics.

**5. REFERENCES**


<table>
<thead>
<tr>
<th>Player Types</th>
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<th>Game Elements</th>
<th>Game Mechanics</th>
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<td>Agôn (C)</td>
<td>Dominance (Ca)</td>
<td>Technology (Sc)</td>
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<td>Social Boldness (Ca)</td>
<td>Conflict (F)</td>
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<td>Risk Taking (Fr)</td>
<td>ENFP/Champion (MB)</td>
<td>Players (F)</td>
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<td>Conqueror (D1)</td>
<td>Extravert Intuitive (J)</td>
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<td>Ludus (C)</td>
<td>Resources (F)</td>
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<tr>
<td>Legend</td>
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| (F) Fullerton [20]          | (F) Myer-Briggs [6, 12] | (MB) Keirsey Temperaments [27] |        |                |
| (1) Laws [29]               | (1) Jung [6, 12]     | (B5) Big 5 [7, 13] |                |                |
| (H) Hess [7, 31]            |                      | Note: [high] and [low] indicate which end of the spectrum the personality trait is located. |                |                |
| (Sc) Schell [35]            |                      |                    |                |                |

Table 1. Proposed table to identify possible player type, personality trait/type and game element and mechanic combinations.