A Framework of Player Objects in Virtual Environments

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ABSTRACT
Based on data gathered from an analysis of 99 digital single-player games, this paper presents a framework named the *PO-VE model* for analysing player objects in virtual environments. Player objects are understood as objects integrated in the virtual environment which constitute the player's point of control and thus frame their actions in the game system. A necessary distinction is made between player object and the presentation of characterisation, separating the notion of "character" from player object, which yields certain analytical benefits. The PO-VE model, which consists of 16 different categories and thus provides a high-granularity analysis tool, is presented using two primary examples from the data set – *The Witcher III: Wild Hunt* and *VVVVVV* – and discussed in relation to its potential applications, limitations, and contributions to the more theoretical domain of game studies.

Keywords
Player object, avatar, character, virtual environment, gameworld, object-oriented design, ontology, analysis model

INTRODUCTION
The very object with which we interact with a digital game has been scrutinised from a variety of perspectives. Using terms ranging from avatar (Linderoth 2005; Bayliss 2007; Klevjer 2007; Vella 2015; Kania 2017; Banks 2018; Willumsen 2018) to player character (Fernández-Vara 2011; Lankoski 2011; Westecott 2009) and game ego (Wilhelmsson 2008), scholars have attempted to understand the ways in which this object establishes a relationship between player and game. What has yet to be uncovered, however, are the details of the ways in which the object is integrated into a virtual environment and in turn how this integration determines its most basic configurations.

The aforementioned inquiries into avatars and related subject matters have largely been developed based on illustrative examples and engagement with the theoretical body of literature on both the topics of digital games, but also a wide array of ideas from different fields, including *(tele)presence*, *immersion*, *identification*, *self-representation*, *interactive narrative*, and *characters*. While such approaches remain relevant for understanding various aspects of avatars and related phenomena, this paper presents an alternative approach. Rooted in the study of 99 different digital single-player games, the paper outlines an inductively developed descriptive analytical framework for understanding what is referred to as *player objects*; the objects integrated in the *virtual environment* which constitute the player's point of control and thus frame their actions in the game system.

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First, the fundamental methodology will be presented and discussed, leading to an introduction of the central terminology used throughout the papers, including definition of the four terms of *virtual environment*, *object*, *player object*, and *characterisation*. Following, the PO-VE model will be presented using two primary game examples, *The Witcher III: Wild Hunt* (CD Projekt Red 2015) and *VVVVVV* (Cavanaugh, 2010). Due to the scope of the paper, existing approaches to related subject matters have been excluded in large parts (for a more comprehensive overview of avatar theory see e.g. Willumsen, 2018). The paper is concluded with a brief discussion of framework's implications and relevance for other domains of game studies as well as potential uses beyond the study of games.

ON THE BASIS OF 99 GAMES

The suggested theory is a result of the coding and analysis of 99 different game titles. These titles were selected based on a variety of criteria for diversity, including platform, publication year, country of origin, and genre label (according to MobyGames). Moreover, a working definition of an "avatar-based game" was derived from an initial review of a paradigmatic selection of approaches: *An avatar-based game is a game in which the player manipulates a single, concrete entity, which functions as the primary tool for playing the game*. This guided the selection to ensure that at least half games corresponded to the criteria presented by other scholars while also leaving room for examples that diverge from existing approaches to avatars, as this was the original term used to describe what is now theorised as player object. As a result, a large variety of games were included in the set. Some can be considered "traditionally avatar-based" based on the working definition (e.g. *Braid* (Blow 2009) and *Firewatch* (Campo Santo 2016)); some only partially match the definition (e.g. *Brothers: A Tale of Two Sons* (Starbreeze Studios 2013) and *Metal Gear Acid* (Konami Computer Entertainment Japan 2005)); and some do not come close to any common understandings of avatar (e.g. *Guitar Hero III: Legends of Rock* (Neversoft 2007) and *A Normal Lost Phone* (Accidental Queens 2017)). The game selection method can be considered non-probability purposive, as the study has a predefined area of focus while lacking specific, theoretical hypotheses. The data resulted from the coding process of the 99 game titles is qualitative rather than quantitative, a characteristic of the purposive sampling method (Etikan et al. 2016, p. 3).

The 99 games were played on original consoles for durations of 25 minutes to 85 hours, depending on the game. Not all games were completed. Rather, the type of play ranged from what Aarseth (2003) refers to as *light play* to *expert play* and *total completion*. Thus, the analyses do not account for the full content of all game titles, but rather for the general experience of a wide variety of titles.

Each title was coded during play, describing elements potentially relevant for the study. The initial coding process was refined to avoid duplicates and redundancy. Initial refinements reduced the number of codes from 300+ to 167. Following processes of scoping and refinement reduced the set further to 83 codes. These 83 codes have formed the basis for the theory presented in this paper and the proposed analysis model consisting of 16 different categories is a direct result of the detailed description facilitated by the comprehensive coding process. It is beyond the scope of this paper to describe and analyse all 99 games from the data set. Instead, two primary titles are referenced for illustrating the application of model.

While the extensive data set may lead to the impression that the empirical grounding of the project makes data or findings quantifiable or empirically generalisable, this is not the case. The hermeneutic nature of play and coding makes the findings non-objective, which poses some natural limitations to the suggested framework and model. This, however, is an inevitable reality of any humanist study in which interpretation is

a factor. The study of games invites pragmatic approaches as the ergodic nature of the objects of study result in additional challenges. Thus, the intention of the presented theory is not to present any fundamental truth of games, but rather to offer an applicable theory which is empirically rooted, offering observations from a large data set to support the claims put forth.

THEORETICAL CORE CONCEPTS

Four main concepts for the suggested theory need introducing to situate the work within existing discourses on related phenomena and to clarify concepts used in the analysis model. *Virtual environment*, *object*, *player object*, and *characterisation* were developed as concepts based on the data set, to account for the phenomena observed. Inherent in this terminology are two distinct approaches to player objects: defined in terms of integration within the virtual environment and defined in relation to characterisation resulting in a mental image of a character.

Virtual Environment

The term *virtual environment* refers to the part of the software system of a digital game which is typically presented to the player through audio-visual means as a navigable space. Using an analogy of object-oriented programming, one can think of it as a (primary or master) object, containing other game objects, such as player object and opponent objects, as well as objects presenting the virtual environment as a type of physical environment or ecology. This software system understanding of the virtual environment is not to be confused with the notion of "game systems", as put forward by Salen & Zimmerman (2004) and often considered the governing principle of gameworlds (Jørgensen, 2013). Through the frame of the game system, games are considered medium-independent artefacts designed for play. The framing of the game as a software system, however, emphasises the system's component parts, how these are related, and in turn how objects can be told apart based on classification made on the basis of the game as a digital product resulting from the execution of code constituting a software system.

"Virtual environment" is a combination of two terms that each bring with them their own history and meanings. "Virtual", as used here, refers to a software system, a computer-based structure rather than a physical object. In the context of this study, the "environment" does not need to be visually represented, as its spatiality remains regardless of modal presentation. However, 2D and 3D renditions of virtual environments often present themselves as, navigable, spatial worlds (according to Murray (1997, p. 129) a defining characteristic of digital environments), that may expand beyond the spatial structures and establish an "ecological world that responds to the player's activities and agency" (Jørgensen 2013, p. 70).

The implications above lead to the following understanding of a virtual environment:

A virtual environment is a (typically visually) modelled part of a software system, which contains other game objects. This master-object can be made accessible to the user through a dedicated object (player object) with which the user can input data into the system, which thus responds accordingly.

In the case of digital games, rules governing the possible interactions between user and system are brought to the foreground and these rules are found on the level of the game as a software system. This definition disregards some aspects of "worldness" (Klastrup 2003) associate with the term, such as mythos and ethics.

Objects

As defined above, virtual environments contain objects. Objects, in this study, can be divided into three primary types; *player objects*, *persistent objects*, and *marker objects*. Player objects will be explored in depth in the next section. Persistent objects are, as their name indicates, persistent in the environment. They always have a seemingly physical manifestation in the environment – a location and represented materiality – independently of how they are interacted with. They do not "disappear" from the environment upon interaction, as opposed to *marker objects*. Marker objects have a non-permanent manifestation in the environment. When interacted with, they can be "picked up" and seemingly disappear from the environment, instead appearing as a marker of a value associated with the *player object*. Examples include health packs which, upon pick up or contact, cease to exist in the environment and instead appear as attributes of the object controlled by the player. The same applies to most objects commonly referred to as "items" or "loot"; objects that can be kept in an inventory or equipped on the player object. Such objects serve a primary function of marking attributes or values that have game-specific significance.

Persistent objects and marker objects constitute different relationships with the player object. Marker objects can be said to alter the (attributes of the) player object whereas persistent objects are treated as distinct entities that can interact and, in some cases, merge with the player object in ways that differ from how the player object internalizes the marker object as an attribute. The health pack example above illustrates how marker objects can cause *player object alterations*. Persistent objects, however, can instead *merge* or *associate* with the player object.

An example of a persistent object is a horse, as they are presented in many modern digital games, including *The Witcher III* and *The Legend of Zelda: Breath of the Wild* (Nintendo EPD, 2017). When Link mounts a horse, the attributes of the player object are not directly altered in the same way as would be the case if he equipped a piece of armour or consumed an apple. Rather, the horse and Link are merged into a new type of player object, a *merged player object*. The horse keeps its physical manifestation in the virtual environment, mounted by Link or not. Merged player objects are rarely permanent but tend to alter not only attributes but also the possible actions that can be performed within the virtual environment.

In addition to the merge, a persistent object can enter an extended relationship with the player object, in which the object becomes associated with the player object and where this association does not directly change the possible actions of the player object but rather constitutes an extension of the player object. This occurs when the persistent object "follows" the player object. An example can be found in *Ico*, where the non-player character and persistent object Yorda follows the player object, Ico, around the virtual environment. The player has no control of Yorda through direct input or a WIMP interface but can control Yorda's movement *through* the movement of Ico as Yorda becomes an association of Ico, calling for her to come closer when needed to solve one of the game's many spatial puzzles.

To reiterate, marker objects *alter* the player object whereas persistent objects can *merge* with player objects to create *merged player objects* or function as *associations*. Both types of objects, however, have initial physical manifestations in the virtual environment, establishing them as actual *objects* in the environment rather than mere representations of non-interactive and purely decorative "fictional objects" (Aarseth, 2007).

Player Object

A *player object* is a special type of persistent object – a concrete and integrated manifestation in the environment which allows the player to interact with other objects in the virtual environment. Thus, it serves as the player's point of control through which she can interact with the software system, for example by navigating the represented model of the environment and interacting with other objects, interactions that can be considered *integrated* because they are bound to the connecting point between player object and environment. In Britta Neitzel's terms, the player object offers an *intradiegetic* point of action (see Thon, 2006).

Different types of games will offer different virtual environments and thus different configurations of the player object. There are three basic configurations of the point of control of the player object:

- A concrete manifestation of a single point of control
- Concrete manifestations of multiple locked points of control
- Concrete manifestations of multiple free points of control
    - with identical possible actions
    - with distinct possible actions
    - with distinct possible actions for each type

Central to all types of player objects is that they are objects in the virtual environment and are thus limited to concrete manifestations rather than abstract, overlay points of control. They are defined by their being integrated in the virtual environment of the game.

Player objects with a single point of control are present in the type of games that are typically considered avatar-based. In these games, the point of control is situated as a continuous point within the virtual environment, manifested by a physically persistent and recognizable object. An exception to this rule is when the point of control is broken when performing dedicated location-altering actions (e.g. fast travel and level-to-level loading and navigation). This does not mean that such player objects must necessarily be controlled directly in "real-time" (Klevjer 2007), through direct control. Games from the data set that present single, continued points of control are, for example, *N++* (Metanet Software 2018) and *Tomb Raider* (Core Design 1996).

In contrast, player objects with multiple locked points of control are found in games where the point of control is discontinuous in terms of its location within the virtual environment. Examples include games where the player controls different objects consecutively, while allowing the player to interact with the virtual environment only through a single component at a time, as for example in *The Witcher III* and *Tales from the Borderlands* (Telltale Games 2014). In these games, players do not have the option of switching between different points of controls at their own discretion, hence its being "locked" to a single player object at a time. Typically, the different player objects will offer different possible actions and be represented as distinct characters.

If players can freely switch between different points of controls situated within different locations in the virtual environment, the game can be thought of as having multiple player objects offering multiple free points of control. Examples from the data set include *Baldur's Gate II: Enhanced Edition* (Beamdog 2013) and *Brothers: A Tale of*

Two Sons. These types of player objects are often found in strategic games where they function as types of resources and where gameplay will rarely halt due to the loss or death of a single player object. In contrast, in games with a single player object or multiple locked points of control, the loss or death of a player object most frequently results in (partial) termination of the progress made in the game. In games with multiple free points of control, player objects can be further divided into three types; those which have identical possible actions, i.e. player objects that are functionally similar; those that have distinct possible actions; and those for which certain *types* or groups of player objects have identical possible actions.

There are two primary ways in which player objects are controlled; through direct and indirect control. The distinction between these two is a reduction of higher levels of details that can go into the study of interface manipulation. In this simplification, direct control refers to interface manipulation where the player's input translates into immediate and direct action of the player object in the environment. Indirect control, on the other hand, refers to interface manipulation where there is a delay between controller input and the player object performing the intended action.

Player objects are defined by their integration within the virtual environment. Thus, games in which the player interacts only with WIMP content (window, icon, menu, and pointers (Chignell & Waterworth, 1991)) are not player object-based. Yet, point-and-click games obviously facilitate interaction with a virtual environment through an integrated player object, only the type of interaction is less direct than in, for example, a typical first-person shooter game. Despite the interaction depending on WIMP content, there is a player object that can be controlled by the player, and which can be defined by its relationship to the virtual environment. Therefore, the category of indirect control is needed for accounting for such games that utilize WIMP features for interaction, while still situating action through a player object. It is, however, important to keep in mind that games with indirect control of the player object differ from games with no integrated player object. Games without a virtual environment, as for example *A Normal Lost Phone*, do not have player objects despite facilitating interaction through a WIMP interface. The same is the case for a game like *Sid Meier's Civilization V*, where only a small part of gameplay – movement of troops – depends on integrated interaction with the virtual environment, which is ordered through the overlay and its WIMP content. The majority of actions that the player perform in the game are not defined through player objects, that is, the game's *primary configuration* is not player object-based.

Player objects can have a variety of attributes that can be either visual, functional, or both. These often have game-specific relevance, for example, a player object's *armour* will determine how much damage it can take before losing *health*. The attributes of the player object are often altered as the game progresses; in many cases using marker objects presented as *items*, but also through encounters with persistent object enemies that damage the player object's health. However, the player object can also be altered through interactions with the virtual environment, independently of persistent or marker objects. Alterations can be spatially and temporally triggered, for example, *stats* can change according to the player object's specific location or at a specific point in the *event time* (Juul, 2004, p. 131) of the virtual environment.

Alterations of attributes may ultimately result in changes in possible actions. This does not mean that the player suddenly controls a different player object; rather, the player object remains the same, only in an altered version.

To summarise, player objects can be defined as follows:

Player objects are a sub-group of persistent objects which are integrated in the virtual environment as concrete manifestations of the player's point of control. They exist in three primary forms: as single, continued points of control; as multiple, locked points of control; and as multiple free points of control. They can be controlled either directly or indirectly and may be altered during the game, which may ultimately change their possible actions.

Characterisation

Thus far, there has been no need for introducing terminology pertaining to the various ways in which player objects are represented in the virtual environment. However, as has been made explicit in much work on avatars and related terms (e.g. Fernández-Vara, 2011; Lankoski, 2011; Jørgensen, 2013; Vella, 2015) there is a seemingly strong and potentially inevitable connection between player object and the presentation of *characters*.

Along with the discussion of the storytelling potential of digital games, the concept of character has been brought up in attempts to uncover whether and how it can be applied to games. Most of these approaches build on theories developed for the study of literature, in which characters are thought of as mental constructions of the reader based on *action* or, as Margolin (1986) argues, *characterisation statements*. Thus, it is not productive to talk about specific *characters* as identifiable objects; instead, we should talk about *characterisation* and the ways in which player objects can function as carriers of meaning, displaying actions and traits that the player may interpret as constituting character.

Whether something contributes to characterisation becomes a matter of contextual interpretation and a rather subjective assessment, for it depends on a multiplicity of factors, most importantly on the interpreting player. Influenced by earlier attempts at measuring character complexity (Willumsen 2018) and previously established analysis models of characterisation (Margolin 1986; Bertetti 2014; Vella 2015) the following three dimensions of characterisation are proposed as essential for understanding characters in digital games:

- Figurative attributes: Primary figurative attributes are name and appearance, the latter including also aspects such as animations, voice, clothes, weapons, and inventory. This dimension represents the most basic types of characterisation that differ only marginally across media depending on their respective modalities.

- Roles and relationships: The different relationships established between a character and its surroundings serves a defining function in characterisation, and roles can be considered a result of such relationships. A game can perhaps be best understood as representing characters through roles and relationships when these are somehow made explicit, either through non-interactive sequences like cutscenes or by integrating said roles and relationships into gameplay.

- Character motivations: The specific motivations of a character contribute to characterisation by exhibiting underlying values and desires. Thus, the demonstration of motivations characterises not just on a basic behavioural or model level (Bertetti 2014), but also in relation to the axiological identity presented (ibid).

Characterisation can occur through various means that contribute to the three dimensions outlined above. Many persistent objects may be characterised, too (as NPCs

– non-player characters), and the framework for understanding characterisation thus applies to objects and player objects alike, the significance of which becomes apparent in cases where a characterised player object merges with a characterised persistent object. It is thus proposed that for a digital game to offer proper characterisation of any persistent object – thus resulting in said object causing a mental image of a character in the mind of the player – it must present all three dimensions of characterisation.

Building on the three dimensions above I thus define characterisation as follows:

Characterisation occurs when the game offers information pertaining to an object's figurative attributes, roles and relationships, and motivations, values, and desires. This may result in a player mentally constructing a character associated with the object. However, the game itself does not contain a "character-object".

Characterisation may influence functional aspects of the player object and vice versa, but characterisation and objects will be kept distinct for analytical purposes. This allows for detailed analysis of *merges* and *association*, the meaning of which differ depending on the characterised status of player object and persistent object.

ANALYTICAL FRAMEWORK

The PO-VE model (the abbreviation standing for Player Object – Virtual Environment) is illustrated in table 1 below, results from the analysis of the 99 games, and incorporates the central terminology presented above. It consists of five primary groupings: *basic configuration*, *player object in virtual environment*, *characterisation*, *customisation*, and *player object and view of environment*. Each grouping consists of several categories, each of which can be of a given type. The types listed are mutually exclusive but include the terms *alternating*, *all*, *both*, and in some cases combinations to account for the wide variety of combinations of categories presented in digital games.

Group	**Category**	**Type**
Basic configuration	Point of control	Single Multiple locked Multiple free, distinct Multiple free, identical Multiple free, types Alternating
	Type of control	Direct Indirect Alternating
	Control through overlay	Partial Full None Alternating
	Possible actions	Alteration through marker objects Alteration independent of marker objects Both No alteration
Player object in virtual environment	Dimensions of player object actions	Two Three Alternating
	Player object alterations	Distinct objects Spatially triggered Temporally triggered Objects/spatial Objects/temporal Spatial/temporal All None
	Player object and persistent objects	Merge Association Both None

	Health	Yes Yes, but labelled differently No
Characterisation	Characterisation of player objects	Yes No
	Characterisation of persistent objects	Yes No Both
	Merge or association with characterised objects	Yes, merge Yes, association Both No
Customisation of player object	Start of (new) game	Creation Customisation Selection Predetermined
	During game	Item-caused Not item-caused Both None
Player object and view of environment	View of player object in environment	Side-view Top-down Isometric First-person, partially visible First-person, non-visible Third-person (behind), partial body visible Third-person (behind), full body Third-person (front) Alternating None (no visual rendition of environment)
	View connection to player object	Connected Not connected Alternating Not relevant (no visual rendition of environment)
	Player control of view	Player object location restricted Player object location and degree restricted Free No control Alternating Not relevant (no visual rendition of environment)

Table 1: Full PO-VE model.

The model is applied to the primary mode of a digital game – its default mode, the configuration of most of the game as played. In many games, the player will be able to set-up or influence the configuration at the initiation of the game or during the game, for example the difficulty setting or the perspective on the player objects. Specifics pertaining to this configuration are many, and those which are accounted for in this study are only those relevant for understanding the player object of the game in question – those covered in the analysis model itself.

Games that constitute different and clearly separated modes, such as *XCOM 2*'s (Fireaxis Games, 2016) strategy and management base building in contrast to the turn-based combat, are separated and coded as distinct entries. When applying the model, *XCOM 2* would be separated into two distinct objects for analysis: *XCOM 2a (management)* and *XCOM 2b (combat)*, as the two modes are easily distinguishable and present vastly different configurations. Yet, different modes are not always structurally separated but rather presented as dynamic changes throughout the game. These constitute the cases for which the term *alternation* type is applied. For simplicity's sake, however, the application of the model will be illustrated using two examples with single primary modes, namely *The Witcher III* and *VVVVVV*.

Basic configuration

The first grouping, *basic configuration*, contains categories pertaining to the basic structure of the player object and includes the four categories *point of control*, *type of control*, *control through overlay*, and *possible actions* (see table 2 below).

Group	Category	Type
Basic configuration	Point of control	Single Multiple locked Multiple free, distinct Multiple free, identical Multiple free, types Alternating
	Type of control	Direct Indirect Alternating
	Control through overlay	Partial Full None Alternating
	Possible actions	Alteration through marker objects Alteration independent of marker objects Both No alteration

Table 2: Basic configuration in PO-VE model.

The types of points of control have been previously discussed. *The Witcher III* constitutes *multiple locked points* of control, as the game offers two distinct player objects, characterized as Geralt and Ciri, that the player uses for interacting with the virtual environment, without having the freedom to choose when to switch between the two. In *VVVVVV*, on the other hand, the player has a single player object with which they can interact with the environment.

The type of control of both games is *direct* – both in *The Witcher III* and *VVVVVV* the player objects correspond to the player's input in real time, with seemingly no delay between input and feedback. Similarly, *VVVVVV* has no interactions through the overlay, whereas *The Witcher III*, as is typical for role-playing games, presents partial control through overlay menus for e.g. skill-point based specialisation.

The possible actions for the player object in *VVVVVV* remain the same throughout the game, thus qualifying as the type of *no alteration*, and are restricted to simple movement actions. The possible actions of the two player objects in *The Witcher III*, on the other hand, are altered throughout the game, both by items (as marker objects) and independently of items. For example, development of Geralt's combat skills will result in different possible attack actions and defence techniques.

Player object in virtual environment

The second group describes the player object as situated within the virtual environment and how it relates to other objects in the environment. The grouping consists of four different categories: *dimensions of player object actions*, describing the dimensions in which the player object can interact with the virtual environment; *player object alterations* – changes to the player object's represented attributes or functions, and how these may result from objects or be triggered spatially or temporally; whether the *player object and persistent objects* can enter the previously discussed relationships of *merge*, *association*, or both; and finally whether the player object is presented as having *health* or an otherwise quantified indication of a state that, once depleted, will terminate, restart, or otherwise influence the progress made in the game.

Group	Category	Type
Player object in virtual environment	Dimensions of player object actions	Two Three Alternating
	Player object alterations	Distinct objects Spatially triggered Temporally triggered Objects/spatial Objects/temporal Spatial/temporal All None
	Player object and persistent objects	Merge Association Both None
	Health	Yes Yes, but labelled differently No

Table 3: Player object in virtual environment in PO-VE model.

In *The Witcher III*, both player objects – Geralt and Ciri – can perform actions in three dimension within the virtual environments, whereas in *VVVVVV* the player object only acts in two dimensions. The player object and its attributes in *VVVVVV* are altered by distinct objects in the environment and by specific gravity mechanics triggered locally (and thus spatially). Similarly, the player objects in *The Witcher III* are altered by distinct objects in the environment as well as spatially triggered, as for example in poisonous areas. Additionally, certain quest-specific actions can be performed only at a given in-game time of the day, thus causing a temporally triggered alteration.

VVVVVV is one of the relatively rare games of the study that presents an *association* between the player object and a persistent object in the virtual environment. This occurs at several points during the game, where the player object becomes associated with NPCs, presented as lost crewmembers that are to be returned to a certain location in the environment. In these situations, the player object's movement will result in different types of behaviour of the associated object, which differs from crewmember to crewmember, thus presenting different challenges to the player (see image 2, p. 13). *The Witcher III* presents *merge* whenever the player decides to utilize Geralt's horse, Roach, for faster navigation of the virtual environment. This merge functions similarly to the *Legend of Zelda* example presented earlier.

Finally, both games present player objects with *health*; in the case of *VVVVVV* there is no detailed health system, but rather an immediate resetting to latest save-point upon collision with certain objects. In *The Witcher III*, both player objects have a given number of health points presented through an overlay health bar.

Characterisation

The *characterisation* group deals specifically with whether player objects and other persistent objects in the virtual environment are presented through characterisation. As previously stated, the character is considered a mental construct of the player and constructed based on the three dimensions of *figurative attributes, roles and relationships*, and *motivations.* Thus, the three categories in this grouping depend on an analysis of the player objects and persistent objects under scrutiny, according to the dimensions listed above, which in turn will determine their respective type.

Group	Category	Type
Characterisation	Characterisation of player objects	Yes No
	Characterisation of persistent objects	Yes No Both
	Merge or association with characterised objects	Yes, merge Yes, association Both No

Table 4: Characterisation in PO-VE model.

In *The Witcher III*, both player objects are characterised according to the three dimensions. Let us take Geralt as an example: he is presented with a specific name and a detailed appearance (see image 1 below), elements of which contributes to an understanding of his profession as a monster hunter. He has a distinct, deep voice, characteristic white hair, prominent scars, and clothing that situates him within the fictional world projected by the game. Through cutscenes and dialogues, the player understands how his role as a monster hunter makes the rest of the world relate to him, as well as how his being as a Witcher causes some people to exhibit negative attitudes toward him. While seemingly independent and focused on his job, Geralt illustrates a will to protect the people around him, especially those to which he has strong personal bonds, including the other player object, Ciri. Thus, all dimensions of characterisation are fulfilled by the representation of the player object, and it is difficult to argue against the case that Geralt manifests as a character in the mind of the player.

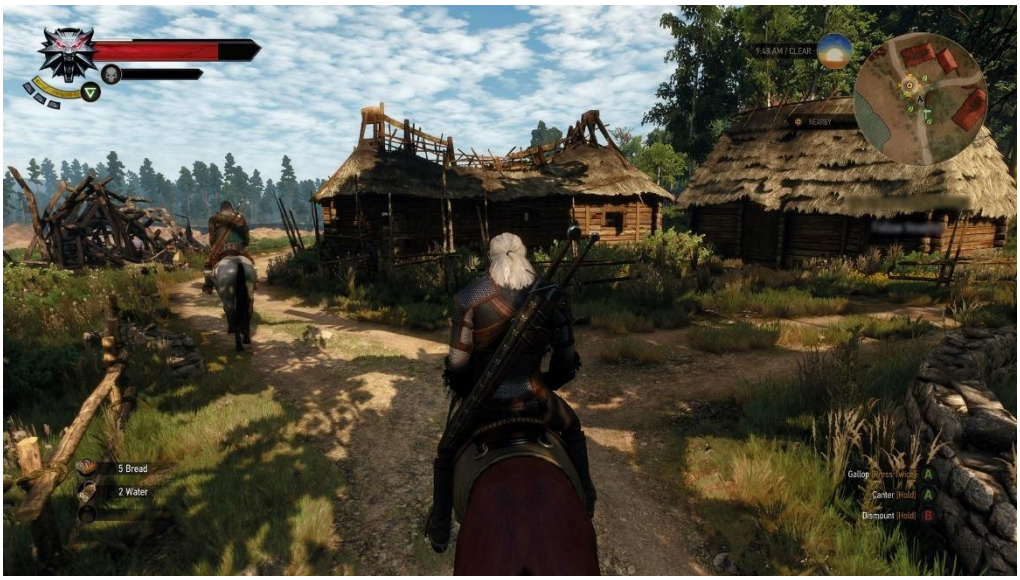

Image 1: Geralt riding his horse, Roach, in The Witcher III: Wild Hunt (CD Projekt Red, 2015) illustrating his figurative attributes.

Captain in *VVVVVV* has a much less distinct and detailed appearance than Geralt (see image 2 below). In fact, the only thing that makes it possible to tell him apart from other persistent objects in the environment is his colour – blue. However, his name and colour fulfil the dimension of *figurative attributes*. Similarly, cutscenes and dialogues establish Captain as the captain of a spaceship, the leader of a group of space travellers, who is responsible for bringing everyone to safety after a teleporter malfunction. This presentation of the player figure provides a basis for relationships between Captain and his crewmembers, as well as a motivation, as a loyal friend and captain, to travel space and save his allies. Thus, *VVVVVV*, although seemingly

sparser in its narrative content and visual presentation, also presents the player object through characterisation.

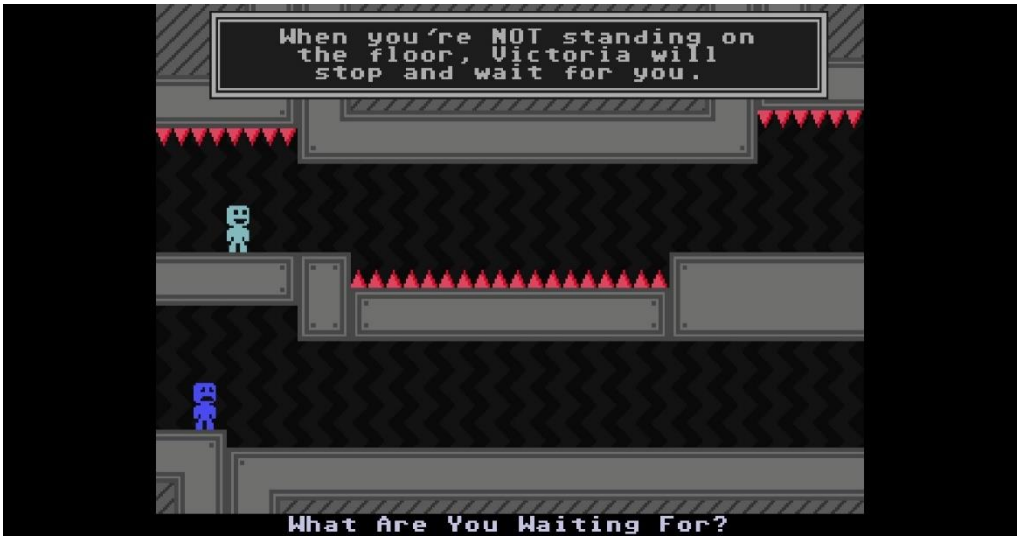

Image 2: Captain (top) in merge with persistent object Victoria (bottom), illustrating Captain's figurative attributes and the association between player object and characterised persistent object in VVVVVV ((Cavanaugh, 2010)).

As has also been presented by the analyses above, other persistent objects are characterised in both games, and *VVVVVV* presents a case of *association* with other characterised persistent objects.

Customisation

The fourth group contains two categories on the customisation of the player object(s). The categories are separated according to whether the player may customise the player object at the beginning of a (new) game and/or during the game. Customisation here refers to representational (primarily visual) as well as functional alterations of the player object's attributes caused by the player.

Group	Category	Type
Customisation of player object	Start of (new) game	Creation Customisation Selection Predetermined
	During game	Item-caused Not item-caused Both None

Table 5: Customisation PO-VE model.

In neither of the two games the player has a say in what represented or functional player object they will be controlling and thus both games present the *predetermined* type of customisation at the start of a new game. This is relatively uncommon for role-playing games, except for in some specific subgenres, like the JRPG as well as the specific action/adventure variety that *The Witcher III* falls under, where the pre-scripted story is a significant part of the experience for most players. Role-playing games will typically allow the player to either *select* a player object from a set of options, or, as is the case in for example *Baldur's Gate II* let the player create their player object almost from scratch, from a comprehensive list of criteria, ranging from visual presentation such as nose-size and hair colour, to the specific starting distribution of their skill-points.

The player cannot customise Captain in *VVVVVV* during the game, but Geralt, and to some extent Ciri, can be customised, using items or not. Item-caused customisation includes item-equipment, which alters the player objects stats and physical appearance, and not item-caused customisation is for example the option of having Geralt get a haircut at the hairdresser, which alters his physical appearance.

Player object and perspective

The final group in the PO-VE model is *player object and view of environment*. It contains categories specific for visually rendered virtual environments and relates to how the virtual environment and the player object are presented to the player on the screen surface. It is a conscious decision that terms like *perspective* and *camera* are avoided, as these inevitably refer to additional objects or subjectivities in relation to the visually presented virtual environment. Thus, to maintain attention on the player object in the virtual environment, the term *view* is used, which in some games can be connected to the player object and be controlled through player input, both in connection to or independent of the player object.

Group	Category	Type
Player object and view of environment	View of player object in environment	Side-view Top-down Isometric First-person, partially visible First-person, non-visible Third-person (behind), partial body visible Third-person (behind), full body Third-person (front) Alternating None (no visual rendition of environment)
	View connection to player object	Connected Not connected Alternating Not relevant (no visual rendition of environment)
	Player control of view	Player object location restricted Player object location and degree restricted Free No control Alternating Not relevant (no visual rendition of environment)

Table 6: Player object and view of environment in PO-VE model.

In large parts of *The Witcher III* the player objects are seen from behind, in what is often referred to as *third-person* perspective, and their full backs, top to toe, are visible to player. However, during dialogue sequences, which is an integrated part of gameplay, the player objects are presented from the front, in what we may also call *third-person*, but which constitutes a type of cinematic presentation of the player object and which contributes to characterisation in a more direct manner than the behind-view (in large parts because the player can see the facial expressions of the player objects). We may, however, wish to exclude from the analysis non-interactive sequences, such at cutscenes, as well as sequences in which the primary configuration of gameplay is altered significantly. This is the case for dialogue sequences in most games, where the player ceases control of the player object in the virtual environment, and instead the point of control is situated solely within a textual overlay. Thus, if disregarding cutscenes and dialogue sequences, *The Witcher III* categorises as the type *third-person (behind), full body* in the model. The view of the virtual environment is directly connected to the player object and altered through the navigation of said environment and thus is of the type *connected*. Finally, the *player control of view* is, when disregarding non-interactive sequences and dialogues, *player object location restricted*.

VVVVVV follows many of the genre-conventions for 2D puzzle platformers, including the *side-view*, where screens are fragmented, and the player is given a full overview of a spatially limited section of the virtual environment. The view is *connected* to the player object in the sense, that its movement out of a currently visible section will cause the view to transition to the next section. Thus, it is also possible to say, for the final category, that the view is restricted by the player object's location. During the game, there are no alterations to this configuration of the view of the environment, and thus none of the types are alternating.

POSSIBLE APPLICATIONS AND LIMITATIONS

The presentation of the PO-VE model using the two game examples makes explicit a high level of details. For some analyses, it may be excessively comprehensive, whereas for others it may require inclusion of additional theories to account for the specificities of individual categories and types. As previously argued, the framework is intended as a pragmatic tool for better understanding player objects, while also serving the function of exposing the complexity of these objects. This supports the implicit argument in the introduction, that the avatar concept, which extends far beyond what is here understood as player objects, has been expanded to an extent where it loses its analytical value, emphasising the need for alternative and novel approaches such as this study.

When considered an analytical framework, many supplying theories can be incorporated to strengthen an analysis based on the use of pragmatic tool. Much effort has been put towards studying for example the spatial structures of digital games (e.g. Fernández-Vara et al. 2005; Nitsche 2008; Aarseth & Günzel 2019) and, while the scope of the paper has not allowed for much integration of such theories, combining the framework at hand with more in-depth readings of spatial configurations and representations in selected titles might prove very fruitful for better understanding the different ways in which player objects are integrated in virtual environments.

A possible critique of the framework could be targeted towards its granularity level. Whereas the *player object* and *virtual environment* terms have been specified and narrowed significantly in comparison to their "avatar" and "gameworld" counterpart terms, the 16 categories extend far beyond the norms of analytical frameworks in a digital game context. Perhaps the model is easier comparable to ontologies or categorisation tools, for example, Elverdam and Aarseth's (2007) typology model for categorising and comparing games, which, coincidentally, has almost the same number of dimensions (17) as does the PO-VE model. In such a context, the model offers an alternative way of approaching phenomena described in other game ontologies, such as the Game Ontology Project's (Zagal et al., 2007) *locus of manipulation* and the associated terminology of *entities*, corresponding in large part to PO-VE's *objects* or, to some extent, the HACS (Historical-Analytical Comparative System) (Therrien, 2017) framework's dimension of *mapping layer*. The primary difference between these frameworks and the one presented here, is the selected focus on player objects and the frame of analysing them in relation to their integration within the virtual environment. Depending on the analysis one wishes to undertake, or the aspect of games one wants to understand better, more and less granular and specific frameworks will serve different functions.

Beyond being valuable for the analysis of digital single-player games for which the framework is specifically developed, this contribution might prove useful for understanding what we might call "user objects" in studies of a wider array of digital media. Thus, it contributes to a better understanding of how an increasing amount of digital media products resemble digital games, either through "ludification" or by mimicking certain characteristics, such as the integration of player objects in virtual environments.

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