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**THE RELEVANCE OF A FUNDAMENTAL
LANGUAGE OF GAMES TO THE ARTS
IN GENERAL**

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Abstract

The proposition is that, incidentally or not, the true object of what is currently called game studies is no less than the essential, natural cognitive language of all forms of interaction with systems.

This idea is researched here from the perspective of the arts, into the sphere of which video games and game design in general (meaning not just video game design but the design of any kind of game) are included. Leaving psychological, neuroscientific or other aspects of this idea to others who may be interested in conducting appropriate research in those fields, the topic is considered from the following perspective:

Just like sound, words and, for example, the visual placement of color in the field of vision each in part naturally “make sense” according to their own completely different mechanisms, their own grammar, and their particular “grammars” correspond almost perfectly to (what is pursued in) music, literature and painting, respectively, perhaps game design corresponds to the natural language and grammar of interactivity (i.e. interaction with or within systems).

Ultimately we will be documenting the design and development of a VR installation built according to these views, called *U Pilot*.

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I. Introduction

“Remember - your movement self-interacts with positive reality!”

Flywrench (Messhof 2015)

The contribution of game design to the arts is the attempt to codify a language, that of interactivity, which is not limited to what are culturally considered to be games - but which is by no other art form sought to be essentialized down to its supposed intrinsic formulas, as the main source of meaning. The choice of the word *interactivity* (instead of interaction) may be quasi-arbitrary, but it will be in effect as a convention throughout this entire study: we will use the word *interactivity* to refer strictly to interacting with or within a *system*; interactivity in this chosen sense is different from free-form human interaction, for example; this is a distinction that is conventionally set to correspond somewhat - not entirely - to the already canonical distinction, and partial overlap, between *games* and *play* in the early field of ludology, as most clearly put forth by such as Guttman in response to Huizinga (Guttman, Huizinga cited in Hsu, n.d.)

For clarification, these ideas about how games create meaning and how that is relevant to what will be re-worded differently and further detailed throughout this introductory chapter, along with brief descriptions of the two components of this study: theory and practice.

Since the practical research project accompanied by this dissertation paper, as well as most of the relevant theoretical considerations in the paper itself, will be in the field of *video* games (for reasons made clear in the text), it may seem that what is being studied is the semiotics of video games.

In a sense, that is true - but only partially; it would be *somewhat* more accurate to describe the object of study as the semiotics of interactivity in art, as derived (if we conclude it can be so derived) from game design. Because rather than simply attempting to understand how video games (as a cultural phenomenon with particular aesthetics, defined in part by its own self-propagating tropes) generate meaning, we are more specifically concerned with what results from the following logical sequence:

First we ask, and attempt to answer, what is necessary and sufficient for something to be a video game (we keep, momentarily, the focus on video games and not on games in general). Many of the cultural tropes of video games (such as those resulting from commonly used character perspectives, functional graphical elements such as the HUD, or genre-defining mechanics with their trademark components: the inventory, the health bar, units in strategy games, the concept of levels etc) might not contribute to the core of what a video game is, so we need to at least approximately identify that core.

Having done that, we further attempt to understand whether or not something resembling that core is also present *and of equally defining importance* in other forms of art, or cultural forms of any kind, that are culturally and aesthetically separate from video games. Also if, and in what measure, it is present as a secondary, non-defining element in such forms (in the way in which elements that are central to cinematography exist in, but are not central to, video games).

Finally, we intend to discover to what extent a semiotic code has been or is being developed for that core in any field, be it video games or something else, and whether or not that semiotic code is of equal relevance to any and all art forms in any and all media that intend to utilize in any way the elements we have identified as the core of video games.

This logical sequence will not necessarily drive the research methodology or the order of exposition in this paper, but it serves as an effective means of communicating what is being aimed for.

We assume, as part of our research hypothesis, that each of the established arts corresponds or seeks to correspond to a pre-existing so-called natural language, that is to say one of several specific, highly differentiated modes or channels of cognition, each with its own very particular intrinsic “rules” for the formation of the true impression of meaning on its level. That this correspondence takes place in the manner of magnetically developing an art form, that is a *way of speaking*, around the central element of each of these given *ways of listening* - thus being made manifest in culture the perfectly natural awareness of the existence and functioning of each one of them as a *language* - a language that, as explained, can only be truly “spoken” and understood on its own level entirely, and not translated. We will come back to this idea.

This assumption is taken for granted, and can be proven false by inconsistencies in the comparisons and parallels we will attempt to draw between various art forms - if the method starts from a false assumption and builds its entire logic on that, that logic must at some point yield incoherent or inconsistent results - results which would require a stretch of willful ignorance to be accepted as validating the hypothesis.

The hypothesis that we seek to validate is that the aforementioned core of *gameness* - to use a word borrowed from Jesper Juul (2003; 2019) - a core common not just to video games but to games in general, is interactivity, and that the semiotics of interactivity is being studied and established only in the field of game studies, because games (not just video games) are the purest expression of interactivity as an artistic language; that the semiotics of interactivity are only the perennial essence, not the entirety, of what may culturally constitute, at the present moment in history, the semiotics of video games; but also that the studying and codifying of the semiotics of interactivity by game studies research is of great relevance to any work of art that willingly or incidentally creates or uses an interactive system, regardless of whether that work culturally positions itself as a video game or not; in other words, that its study is relevant to the arts in general, especially given the contemporary tendency towards the fusion of media, in the same way in which the study of the other distilled artistic languages is.

It is also worth noting that the use of the word *semiotics* in this context is of debatable relevance, and it would be necessary to establish what is meant by semiotics of video games or semiotics of interactivity, in some detail.

To quote the essay *Semiotics and the cinema: Metz and Wollen* by Gilbert Harman (2009, p. 22):

Instrumental music is not a language, a system of signs. It has no meaning. It does not represent or signify anything. An understanding of musical structure plays a role in our appreciation of music, but that is not to say that an understanding of the significance of musical signs plays a role in our appreciation of music. Much the same is true of our understanding and appreciation of films.

Thoroughly debating this idea, and how it translates in the context of video games or of games in general, would require a separate essay. However, we will start with an intention not to look for *signs* in the sense of denoting or connoting something other than the signs themselves; we will not attempt to decipher whether or not, and how, games are *about* something - that is a worthwhile pursuit, but it is not the pursuit of this paper.

We will instead scratch the surface of looking into how games (and, by comparison, other art forms) generate *the cognitive impression of meaning* - not of meaning *something* necessarily, since, as the above quote from Harman suggests, not all sets of signs communicate by conceptual or mnemonic signification (like words mostly do).

Harman also writes elsewhere in the essay, referencing *Film Language: A Semiotics of the Cinema* by Christian Metz and *Signs and Meaning in the Cinema* by Peter Wollen, respectively (Metz, Wollen cited in Harman 2009, pp. 20-21):

Wollen's next point is that although signs are often used to communicate messages, they are not always used in that way and are not used that way in films. A scientist working out the implications of a theory, a mathematician doing a calculation, and a traveler planning an itinerary are all using signs, but not to communicate with anyone. They are, as it were, seeing the implications of certain signs. Similarly, a poet, an artist, and a film director are using signs but not to communicate any sort of message. To suppose that they are is simply to make a mistake about what they are doing. They, like the mathematician, scientist, and traveler, are using signs for a different purpose. Like them, they are constructing signs in order to see what the implications of those signs are.

Wollen therefore rejects Metz's idea that the purpose of film semiotics is "to study the ordering and functionings of the main signifying units used in the filmic message." Metz's proposal is due to his linguistic analogy. Language is often used to communicate messages but film is not normally used in that way. Films have meaning and significance but they do not carry messages—any more than other works of art.

This is relevant to us in that not all sets of signs *communicate*, in the sense of delivering a message that can be translated to a different set of signs (specifically, into words). To attempt to rephrase what is being said in the quote: all ideas about communication and message seem to stem from habitually drawing a parallel between a given set of signs and the way we usually think of our use and understanding of *language*, i.e. words.

Expanding upon Harman's observation, we will assume instead (since researching this, again, is an effort best left to other, very lengthy studies in other fields) that when we qualify something non-linguistic as *meaningful*, be it a piece of music, a painting, a video game, a poem, or simply a moment in one's own immediate experience of reality, it is because it generates in our cognition one or more of many kinds of feedback that are spontaneously, organically *recognized* by us as *making sense*.

Just as in the case of semiotics, here too, even more, very in-depth research into psychology, neuroaesthetics, anthropology, and other fields would be due in order to properly back up these assumptions, as well as others made in the following paragraphs. We will instead start with these empirical assumptions as part of the hypothesis, and make sure that they are proved or disproved along with it while remaining within the limits of the present research.

Not all the feedback mechanisms that make us perceive an experience as *making sense* are linguistic - as Harman argues in the above quote - nor do they necessarily arise out of our interpretation of secondary meaning from signs (secondary i.e. other than the signs themselves); rather, what seems to happen in all of those instances, linguistic or not, is that a certain set of objects of cognition arranged in a certain way triggers in us the confirmation that what we are experiencing makes sense *on its own level*. While this is highly subjective and, in extreme cases, that cognitive impression of meaning upon experiencing a certain work of art may arise in one person and be completely absent in another, most fields of the arts (which seem to approximately correspond to modes of perception, modes of *making sense* of reality, that are isolated, studied, and consciously crafted-for by the artists) have their own individual *codes*. Harman (2009, p.21) notes:

The word code as it is ordinarily used is ambiguous. It can mean either cipher or standards. We speak in one sense of messages in code and in another sense of the military code and of codes of dress.

Here we use the word in its latter sense, but with the mention that it corresponds partially to the first sense as well - or even better, to the sense of the word *code* used in computer science. Because the standards, the sets of signs and structures of syntax that theorists of the various fields of the arts attempt to establish (and often to demolish and then reinvent), and that artists constantly use, are not just there for *connoisseurs* of that field to better appreciate the artist's craftsmanship; instead, they seek to approximate either intuitively, scientifically, or both, cognitive processes that exist independently of that art form and to enable the artist to trigger those processes in the audience. A person who plays an instrument *by ear* still caters intuitively to the same mechanisms of spontaneous-validation-of-meaning in the cognition of their audience as a composer who perhaps studies music via mathematical formulas on paper. In that sense, it is a pre-existing *code* that artists and theorists seek to understand and to use coherently, and we speculate here that more or less each of the different modes of artistic expression, as we already stated above, corresponds fundamentally to exactly one such code - while at the same time all of these codes coexist simultaneously in our perception of reality. Many works of art and many fields of the arts appeal simultaneously to several of these modes of making sense of reality, but it seems generally true that the primary modes of sense-making that are traditionally triggered by music (sound in and of itself), by painting or photography (image in and of itself), by literature (language), by film (sequences of images) or by sculpture (spatial reality of objects) - to give a few examples from more "traditional" categories of the arts - operate on what can empirically be called different channels of cognition. There is music in film, most often, but it is not what makes it film; there are often words to songs, but it is not what makes them songs; and so on. Just as well, in a *multi-media* work of any kind, several of these and others may be present - but it seems to us that each one of them operates separately, at least to some degree, *as a mode of cognition*. It is these modes of cognition, seen from the perspective of the artist - who seeks to *decipher* how they work in order to use them effectively according to intention - and their direct

correspondence to established fields of the arts which seek to essentialize each one of them, that we call *languages* in the present paper. We prefer to use more vague words such as *language* or *grammar* instead of the word *semiotics*, to avoid expanding into a field of research where much has already been written (semiotics in general, but also semiotics of games, and semiotics of video games), the referencing of which would require us, for scientific rigor, to considerably expand the scope and length of the theoretical part of this study.

This idea of artistic languages and of what exactly may constitute the language of video games is very convincingly put forth in almost these exact terms in the short video essay *The Last Guardian and the Language of Games* (Game Maker's Toolkit 2017), which constitutes one of the main inspirations for the views explored in this thesis:

It's clear that each artistic medium has its own unique language. Painting uses the language of shape and colour. Music is an exploration of sound. Literature uses the language of, well, language. And film is about moving images. And video games can, of course, use all of this stuff. But what makes the medium unique is interaction. Things like mechanics, rules, and systems you can poke at are the language of video games.

We will therefore start from the hypothesis that interactivity is the defining *language* of video games, and attempt to prove and disprove said hypothesis; if it proves true, we will explore whether or not this language of interactivity is entirely common and equally fundamental to all “games”; this will imply some form of a working definition for games in general and for video games in particular, the former category being much more complex than the latter.

Because of the limited scope of this preliminary study, to be expanded upon in further research, only two other fields of the arts will be used for comparison: film and contemporary interactive art.

There remains the possibility that the hypothesis does not stand, that we find game design to be ultimately its own limited domain, applied only to a particular case of interactivity - namely what is called “games”; this would suggest either that non-game forms of interactivity have their own different ways of generating meaning, without a common denominator between them and games (or even that there is no such discernible grammar outside game-type interactivity, but that non-game interactivity can and does nevertheless generate meaning using non-game patterns) or that there is a common denominator, only it’s not within the scope of game design - but bigger than it. This would mean that even if game design does contribute a framework for a kind of grammar that can be relevant to the arts in general, that framework is far from universal.

Even if this is the case, it seems important to distill that framework and to separate it from the cultural category of video games in order to be able to apply it in its most abstract form. Which result will be perhaps the real merit of pursuing the present research.

And to this latter end the practical part of this study, which is its primary focus, will prove most useful.

The practical part of this study consists of the development of an interactive piece that, for reasons that entirely tie in with the research hypothesis, will be alternately called a game and an installation. The work in question, titled *U Pilot*, intends to make use, to the letter, of the formulas for meaning-generation that are researched and hopefully perfected in the theoretical part of this study (namely, gameplay structure in its most abstract sense) while at the same time building its interaction from scratch, without any cultural video game elements, and making sure to never frame itself to the public as a game.

U Pilot is an abstract real time breath feedback game in VR. A respiration belt sensor is the only controller, and several increasingly complex mechanics will be implemented as the project is further developed.

For the moment, the objective is to fully implement the game’s most basic mechanic and produce a polished, engaging demo experience, the contents of which will be detailed in the appropriate chapter of the present paper.

Contrary to appearances, *U Pilot* is not conceptually designed around the unconventional hardware input, but on the contrary, around the proposition of stripping down the definition of

“video game” to its very basics, excluding hardware, software or cultural templates of any kind, designing gameplay *in a blank space*, so to speak, building up from there and structuring the implementation, including the hardware setup, around what best accommodates the requirements of the design.

Finally, a necessary mention in this introductory chapter: all research conducted so far as part of this study, theoretical and practical, is in its most incipient stage and is to be expanded upon in writing in the future.

II. Theoretical framework: starting points for delineating “games” within the arts

II.1. Fundamental differences between (video) games and audiovisual content in their formation of meaning

The title of the current sub-chapter seems vague, because it contains the word *video* between brackets. This is due to an implied extrapolation: we are looking at a comparison between *video* games and the audiovisual (mainly cinematography), but we seek a conclusion about *games in general* and what defines them as an art.

The reason for the comparison appears obvious: we compare video games to movies because video games inevitably use audiovisual language, albeit differently.

(Note: the use of audiovisual or cinematographic language in video games, and how it differs from its use in cinema, or in video art, or in mainly audiovisual creations that do not aim to position themselves as art - is not the subject of this study.)

The reason for the attempt to expand the conclusion to games in general may seem like a stretch: while board games, for example, generally do not employ audiovisual language, we hope to find, in isolating what makes *video* games a unique form of art (rather than a conglomerate of elements from pre-existing forms such as cinematography and literature), something that pertains to their *gameness*, and that runs deeper and is much older than their current-technology-bound *video*-ness. It remains to be seen if this is the case.

As we have established in the introduction, what we are aiming for is not an effort of translating the supposed meaning (in the linguistic sense of the word *meaning*) of the supposed “content” of a work from the grammar of its medium to that of another medium, nor to a neutral one. By *meaning* here we do not refer to a “what does the author mean?” type of investigation. Rather, we are concerned with *how* meaning is formed - where *meaning* is understood as the spontaneous, often possibly pre-linguistic impression of cohesiveness, the natural cognitive confirmation that the work in question *makes sense* on a level that most often does not require explanation or translation in order to function. Expanding on this would mean looking into neuroscience, specifically into how the brain interprets information of different kinds (images,

sounds, words, concepts, spaces etc); not having the knowledge necessary to research in that direction, we will instead limit ourselves to a quasi-empirical analysis of the surface of these things, of their manifestation as it has been and will continue to be established and re-established, by a combination of intuition and trial-and-error, in the study and practice of the arts.

In this regard, cinematography has, from its earliest days, attempted to understand the natural functional units of its own grammar. While elements of visual composition are not unique to film (since, from the point of view of composition, film is obviously a succession of photographs), what has been studied as unique to film from its beginning was *montage*.

Perhaps the most essential moment in the early history of cinema, that came to define its language not just in its canonical, narrative form but in any form that involves a linear audiovisual sequence, is what we know as the Kuleshov effect - of which Mitchell Stephens (1998, p. 102) writes:

The essential experiment in film montage was conducted by Lev Kuleshov, the Soviet Union's most influential film instructor. He simply took old footage of the expressionless face of the well-known actor Ivan Mozhukhin and spliced into it three unrelated shots: a bowl of soup, a woman in a coffin and a girl playing with a teddy bear. When audiences saw this little film, they "raved about the acting of the artist," reports Kuleshov's student, the filmmaker V.I. Pudovkin. "They pointed out the heavy pensiveness of his mood over the forgotten soup, were touched and moved by the deep sorrow with which he looked on the dead woman, and admired the light, happy smile with which he surveyed the girl at play."

"The point of what became known as the "Kuleshov effect" is that the meaning of a shot is dependent upon the shots that surround it. The point of montage, the Russians realized, is that new meanings can be created through the juxtaposition of different shots.

The same chapter of Mitchell's book discusses at length the development of the language of cinematography - and later of television - as having stemmed essentially from the experiments of directors such as D. W. Griffith, Sergei Eisenstein and Dziga Vertov. Looking at the most fundamental techniques for generating meaning audiovisually (all of which have to do with moving the point of view (the camera) and/or juxtaposing different scenes, from traditional editing to the cut-ups, split-screens and superimpositions employed by Peter Greenaway and others), we will take the risk of affirming with near-certainty that the statement in the above quote is the core of what is behind them all, and thus the core of the language of cinematography. Namely, the observation that "the meaning of a shot is dependent upon the shots that surround it" (where the concept of *shot* can be expanded to mean any individual audiovisual unit, whether produced by a camera or otherwise) is necessary and sufficient to develop and use methods of generating meaning in any medium of the moving image.

In a very real sense, most video games are also a medium of the moving image (whether or not we can include pure text games, for example, in the category of "video games" is debatable).

Looking at someone playing a video game as opposed to someone watching a movie (or even a recording or a live stream of someone else playing a game, for that matter), it becomes apparent that the difference in how each person *receives* the experience is in the presence or absence of interactivity. And if the centrality of interactivity or of something deeper or vaster than it can be debated when studying video games themselves, we find it difficult to question the idea that the essence of what distinguishes video games from film or video is interactivity, the shift from watching to doing.

Still, there are such works as interactive video novels - essentially narrative films, either live-action or animated, where the viewer chooses how the story will progress, most often from the narrative point of view of the main character - that are classified either as films, e.g. *Bandersnatch* (Netflix 2018) or as video games, e.g. *Life is Strange* (Square Enix 2015), depending mostly on their authors' marketing decisions.

How much of the viewer's *doing* is really *active* is a question with deeper implications that we find unnecessary to explore here.

In the specific case of interactive video novels, what we find to prove rather than disprove the hypothesis is that, while interactive works are marketed both as video games and as works of cinema, it would be impossible to market a purely audiovisual work with zero interactivity as a video game.

To further support this idea, we will briefly quote the conclusion of what is being explained at length in the Youtube video *The Last Guardian and the Language of Video Games*, drawing a comparison between video games *The Last of Us* by developer Naughty Dog, and *The Last Guardian* by developer Team ICO, directed by Fumito Ueda. In the video, after a cutscene from *The Last of Us* is analyzed and compared to a gameplay moment from *The Last Guardian*, the following is said (Sony Interactive Entertainment cited in Game Maker's Toolkit 2017):

Where Naughty Dog is largely borrowing from film to tell the story of Joel and Ellie, by using mechanics and rules to tell their story, *The Last Guardian* is an artistic work in the medium of video games. *The Last of Us* does get some bonus points for making Ellie become a more formidable character in the combat sequences, following that important cinematic.

It helps the thesis that the comparison being made here is not between two culturally different art forms - video games and cinematography/tv/video - but rather between elements of the two languages - that of interactivity and that of the audiovisual - in video games themselves, and how they contribute to *gameness*.

In the game *Enslaved*, which the video (BANDAI NAMCO Entertainment, cited in Game Maker's Toolkit 2017) uses as an example, there is a moment at the beginning of the game, where the meeting of both languages can be seen. This is far from being an iconic moment in the history of video games or even iconic for that game itself. It will most likely be ignored by most players, but we find it relevant to our thesis specifically because of being a rather common (although very well crafted) use case of the two languages together:

The player-controlled character runs and jumps across the exterior of a large, crumbling airship that is about to crash. There is a moment when massive metal debris - which then turn out to be

combat mechs - fly out violently in the player's direction. From the point of view of game mechanics, there is no threat to the player-character. That is simply an animation, so it could be said to belong to the language of cinematography. But the effect - that of making the player feel in danger for a split second, and of making them feel relieved and lucky that they escaped the impact through sheer chance, not skill - would not have occurred with the same intensity had that moment been a cutscene, or had it occurred in a movie instead of a video game. The intensity - the (albeit arguably superficial) emotional *meaning* of that moment - results not just from the audiovisual content (the large metal debris flying visibly and audibly, suddenly and with great speed, towards the character that is somewhat centered on the screen) but rather from how this content ties in with the player's *sense of agency* resulted from interactivity. More specifically, from the split-second illusion that the player can, and should, *do something about it* so that the character, with whom the player is identified through that sense of agency, does not get hurt. Ultimately, this kind of experience - like the experience of cinema roughly a century before it - is the result of technology. The grammar of the audiovisual was born from the technology of video (and audio) recording and playback; on the playback end, this means cinema and the TV set. And, as Metz puts it (Metz cited in Harman 1977, p. 15):

It was precisely to the extent that the cinema confronted the problems of narration that... it came to produce a body of specific signifying procedures.

Since the computer (considering it as the origin and model for all current devices that are used for gaming, from consoles to mobile), which is also currently the main go-to medium for movies, music videos and all kinds of non-interactive audiovisual art, is a primarily interactive device, it would make sense to say from a design point of view that it *affords* an art form that uses that interactivity - one in which the audiovisual medium (plus haptic feedback and other forms of input/output) is *what is being interacted with*.

It is compelling to conclude from all these observations that interactivity is the core language of video games, but we will not do that yet - especially since we proposed a different methodology, that of starting from the hypothesis and either proving or disproving it.

We feel, however, than we have not only stated the obvious - that the striking difference between video games and video works (including but not limited to films) that are run on equivalent hardware devices is interactivity - but that we have argued for the idea that this interactivity is the expression that emerges as a possibility from the specific hardware used.

II.2. Fundamental differences between (video) games and interactive art in their formation of meaning

The following is a quote from the essay *Abstraction in the Video Game* (Wolf 2003, p. 49):

Video games also differed from interactive art because of their status as games, which meant that there was usually some motive or goal toward which the player's interaction was directed, whereas in art, the experience itself was the goal.

We keep the word *video* between brackets in this subchapter title also, as it seems we have already shown that what differentiates a video *game* from other forms of video content is interactivity (which would seem to indicate that interactivity could be what makes something a game, video or otherwise) but we have not yet extrapolated from video games to games in general, or looked into what games in general are, if defined somewhat rigorously.

We will start the exploration of interactivity in art by looking at existing literature on the subject. It is of course possible and even probable to miss out on a specific book or paper where the part of the hypothesis that is the object of this chapter (i.e. that ultimately the difference between video games and interactive art is cultural, and that of these two, games are the form in which theorists seek to formulate a grammar of interactivity - but that this grammar, stripped of the particularities of video game culture, applies to all forms of interactive art equally; also that this

grammar is not being studied elsewhere in the arts) has already been stated as such. What is relevant to the research is to what extent such writings, if they exist, are commonly referenced, or their ideas treated as common knowledge in the field of interactive art.

So far, the only place where this idea has been found written in its entirety (although in radically different terms) is in the book *Play Redux: The Form of Computer Games* (Myers 2010, p. 5):

From the perspective of semiotics as a science, computer games are most essentially semiotic machines that generate and transform meanings through the coded manipulation of signs and symbols. The more accurately we are able to replicate these evocative qualities of computer games, the more likely we are to gain insight into some of the more problematic areas of human representationalism. To this end, the procedural structures of computer game design and play may be considered homologous to the human cognitive structures that enable them. Therein, the study of computer game forms and rules—and particularly the study of the interactive and transformative properties of paradoxical play with those rules—has the potential to emulate the representational qualities of the human mind in form and, perhaps, in function.

A particularly concise and eloquent exposition of what is essentially the entire preliminary thought process behind the current study - minus its essential piece, namely games and game mechanics - can be found in the *Behaviourist Art and the Cybernetic Vision* (Ascott 1966;1967). The concept of self-arranging systems, or rulesets, is essential to both Ascott's essay and the present study. About this (and in connection with games), Juul (2003; 2019) writes:

Why is there an affinity between computers and games? First of all, because games are a transmedial phenomenon. The material support needed to play a game (like the projector and the screen in cinema) is in fact immaterial since games are not tied to a specific set of material devices, but to the computational processing of data. Secondly, because the well-defined character of game rules

means that computers can process them. It is then one of the stranger ironies of human history, that the games played and developed over thousands of years have turned out to fit the modern digital computer so well.

Juul's statements here go deep into the territory of game studies, beyond video games and into what will constitute the subject of the next subchapter - what it is exactly that we consider to be games.

Roy Ascott, who at the time of writing could not have predicted the relationship between (video) games and the subject matter of his essay, deems contemporary art (or "Modern Art", as he calls it, but not in the usual sense of those words) "cybernated" art. He juxtaposes his vision of art with a definition of cybernetics (de Latil, cited in Ascott 1966; 1967, p. 128) and writes:

Modern Art, with its fundamental behavioural quality, is thus the art of the organisation of effects. [...] Cybernetics, of course, is the science of the organisation of effects, and of the automatic control of effects, as Pierre de Latil has noted.

Ascott's observation is nothing other than a highly essentialized version of Juul's, preceding it by several decades. What Ascott perceived to be the essential shift in what he calls Modern Art is not just participation, but *interactivity in the cybernetic sense*.

Ascott (1966; 1967, p. 110) makes the point, first of all, that what he calls Modern Art is *behavioral art*:

The dominant feature of art of the past was the wish to transmit a clearly defined message to the spectator as a more or less passive receptor, from the artist as a unique and highly individualised source. This deterministic aesthetic was centred upon the structuring, or "composition," of facts, of concepts of the essence of things, encapsulated in a factually correct visual field. Modern Art, by contrast, is concerned to initiate events and with the forming of concepts of existence. The

vision of art has shifted from the field of objects to the field of behaviour and its function has become less descriptive and more purposive.

And then (Ascott 1966; 1967, p.128), that this behavioral art is inevitably *cybernetic*:

The basic principle is *feedback*. The system Artifact/Observer furnishes its own controlling energy; a function of an output variable (observer response) is to act as an input variable, which introduces more variety into the system and leads to more variety in the output (observer's experience). This rich interplay derives from what is a self-organising system in which there are two controlling factors; one, the spectator is a self organising sub-system; the other, the artwork is not usually at present homeostatic.

There is no a priori reason why the artifact should not be a self-organising system.

What is most interesting, especially given when the essay was written, is that he draws this conclusion not about the digital art of today, that explicitly uses interactivity, but about such things as paintings or sculptures that are designed to offer the viewer a strategic empty space for projection. We could say, rephrasing his ideas, that the craftsmanship of the authors of such works is in subtly creating a system that triggers a feedback loop between the viewer and the artifact, even though the artifact is static and the informational loop only occurs in the viewer's imagination. It wouldn't be too far, maybe, from Ascott's ideas to call the vision of such artists *interaction design*, in a very abstract sense, rather than painting or sculpture. In this sense he (Ascott 1966; 1967, p. 129) exemplifies Yves Klein and Ad Reinhard:

Equally, there is no a priori reason why the artwork should become a self-organising system; the basic feedback process of behaviourist art operates within the conventions of painting and sculpture, provided that they display low definition, multiple associations and indeterminate content, within parameters which are, at least implicitly, flexible. And, as we have suggested already, this is

nowadays the case-even to the extent of providing a more or less empty receptacle (the canvas) into which the spectator can project his own imaginative world, e.g., Yves Klein, Ad Reinhard.

These elaborations on the conceptual evolution of art, while they do not directly reference anything interactive in the digital sense, do lay out the background of ideas for understanding such art as well as the evolution of the arts to this day, and possibly way into the future; this is especially true if we are to expand Juul's observation (2003; 2019) from computers and video games - as particular forms - to digital hardware in general (digital hardware that is the *object of artistic creation* itself, along with the accompanying software), or to interactive/cybernetic art in general: it logically follows that, as the computer turns out to be the naturally fitting support for what we can call the *cybernetic nature of games in general* (unrelated to whether the games are digital or not), just as well the field of hardware engineering (which created the computer in the first place) might be the naturally fitting support for the cybernetic conception of art in general.

What, then, is the difference between such art and video games? We have already referred to video games as a subset of cybernetic art, since this is the logical conclusion that follows from the fact that they both have in common the language of interactivity. If, in the case of audiovisual arts, that language was what made the separation, here that language is what unites the two - and it seems that the separation consists of one being more particular than the other.

In many if not most instances, interactive digital installations are just as much about the hardware, but beyond that, since they come from an exploration of cybernetics itself and of how hardware/software changes our reality, our worldview and our psyche, they seem to be especially concerned with conceptually *getting a point across*, or simply with experimenting for the sake of experimentation, in regard to these matters. To give an example (Kwastek 2013, pp. 26-27):

The first artist to be fascinated by the ideas of cybernetics was the Hungarian sculptor Nicolas Schöffer. In 1956, he designed a "cybernetic spatiodynamic sculpture," called CYSP 1, whose movements were controlled by external light

and sound pulses. In many of his works, Schöffer used a cybernetic apparatus called a homeostat, which controlled different forces with the aim of attaining a stable equilibrium. As early as 1954, Schöffer celebrated the nature of this apparatus in his publication “Le Spatiodynamisme”: “It is . . . a homeostat that will control these sounds, always in an unpredictable way. This will create a total Interactive Art—Definitions and Origins 27 synthesis between the sculpture and the sound . . . with a maximum of flexibility because it immediately adapts to any change in the environment.” Schöffer’s interest in interactivity was thus primarily focused on interaction with the environment, and, in particular, with light and sounds. However, he also had dancers perform with his sculptures. Furthermore, in 1973 he staged an opera, titled *Kyldex*, in which the audience was able to influence the course of events by holding up colored signs.

Just like in this seminal example of digital interactive art, the more recent examples of art works studied in the final chapter of the cited book (Kwastek 2013, pp. 177 - 259) seem to have this in common: even though the audience explicitly interacts with the work and there is some kind of meaning to the feedback that the work gives to the audience, that meaning is either conceptual, purely technological, or most often both - i.e. it is a meaning in the sense of the word that we left intentionally unaddressed in the introduction of this paper: something secondary to be understood or translated. It could be said that the user’s experience is about the installation - whereas, in the case of a video game, the game is about the player’s experience.

But even more specifically, since we are concerned with specific elements of a supposed grammar of interactivity, we will necessarily observe that such means of sense-making as we have noted previously when analyzing the game *Enslaved* (BANDAI NAMCO Entertainment, 2013) - i.e. the use of the player’s sense of agency, such as, for example, to create narrative and/or mechanical identification with an in-game representation of an agent - do not stand out in the case of most interactive digital art.

This has little to do with narration itself, since not all games are narrative and not all non-game interactive art is non-narrative. It also is not limited to identification with a character, since not

all games have characters and there is nothing in the extremely broad scope of interactive art that prevents it from having characters. Actually, if we consider the example mentioned in the previous chapter, that of interactive video novels, as somewhat belonging - by a big cultural stretch - to interactive art just as games do, then the matter of identification is seen differently: interactive video novels do create identification (albeit mostly by cinematographic means) and they do often use the viewer's sense of agency in making choices for the character(s) - see *Bandersnatch* (Netflix 2018). So there is no boundary that forbids interactive digital art from using the same devices that games do, and in this sense video games are indeed, abstractly speaking, a particular case of digital interactive art - but what, then, best pinpoints the difference, in terms of language, between most products culturally positioned as interactive digital installations (whether or not they borrow *aesthetic* elements from video games, even elements of game-type interactivity, but use them differently) and most products culturally positioned as video games?

To return, for this, to the quote at the start of the chapter, we could conclude, as it is often considered, that games are defined by in-game goals, "whereas in art, the experience itself was the goal." (Wold 2003, p.49) Other than the formal separation between games and art in the cited text, what remains to be established are the following two points:

One, if indeed "the experience is the goal" in interactive non-game digital art, but not in games. The proposition is vague, and keeping in mind what we have previously concluded - that most games are about the player's experience within the game while most non-game digital installations (using them as the fullest expression of interactive art) are about the concept, therefore about the installation itself - Mark JP Wolf's statement (2003, p. 49) quoted in the beginning of this subchapter does not seem to hold true in this regard.

The other point is whether or not all (video) games are defined by goals and player motives. And if found true, whether those goals and motives are simply a peculiarity of a particular region of the interactive language (i.e. what we call games) or rather goals and player motives are *the main sense-making device* in the language of interactivity, a device which, while it seems culturally to be the specific domain of video games, is not in any way exclusive to them; there is no reason why non-game interactive art could not use this device. Whether game-specific devices such as

goals, player motives, or something else, are just a more or less random option on the part of the artist or, instead, they seem nonetheless to be the most condensed way of fully using interactivity in a way that turns it into a discernible language with its own units of meaning, as in the *sense-making* triggered directly within cognition (rather than meaning *something* other than itself); a language that can be reliably used independently of video games culture or aesthetics.

To finally establish this, we will need to look at what a game is, exactly.

II.3. Necessary and sufficient criteria for something to be considered a video game

There are, in the field of game studies, several approaches to what makes a game be a game. What is common to most (probably all) of them is that they do not make a fundamental functional separation between video games and games in general.

One of the most cited works in the field, *Rules of Play* (Salen & Zimmerman 2004), is for the most part preoccupied with non-digital games - from which it attempts to extract principles that apply to digital games as well. The core of game design is usually taught and studied independently of technology, and many video game designers use non-digital (e.g. board game inspired) methods for prototyping the logic of their digital games.

What, then, is a game?

The previously-cited essay by Jesper Juul (2003; 2019) gives perhaps the most generous definition we have been able to find (together with the very relevant footnote from the cited text):

A [classic¹] game is a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts

¹ „Note added, 2019: This article describes a classic game model, and shows how video games are evolving beyond and modifying this classic model. However, it has turned out to be possible to read the definition out of context as if it was proposing an ahistorical or prescriptive definition of games ("what games should be, for all eternity") instead. I have added the word *classic* to clear up any confusion. It should probably have said *classic game* all along.” - note by J. Juul from the cited text (2003; 2019)

effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable.

So, to return to Ascott's (1966; 1967) idea of cybernetic art, a *classic* game is a certain, specific kind of cybernetic system, a logical structure. It would make sense, then, and immediately, by the logic of transitivity, bring us to the confirmation of our research hypothesis, to say that the game paradigm codifies at least a very broad spectrum of particular cases, if not the entirety, of the applications of the conceptual backbone of all interactive art.

What prevents us from concluding this without some dishonesty is Juul's footnote.

Juul intentionally leaves room for an expansion of what a game can be - which is indeed the only right thing to do when studying a field that is *primarily concerned with designing systems of rules*. It seems like a counterproductive and ultimately false idea to postulate ultimate truths, i.e. rules, about what a game can or cannot be - but that is something of a paradox, since it already relies on having postulated at least that a game is a system of rules, and that designing a game means designing those rules for a specific experience.

Another, even more rigorous approach to what constitutes a game is to be found in the methodology called *rational game design*. Originally an in-house corporate methodology created by and for Ubisoft, rational game design, although not officially public, seems to have increasingly influenced the video game industry in recent years. Some parts of its principles can be read about in a Gamasutra article (McEntee 2012) called *Rational Design: The Core of Rayman Origins*:

For every game experience, a clearly defined objective or goal must be present; whether or not this goal strongly influences the player's actions directly is a different story, but the player must have a sense of purpose in the world they are traversing. In a platforming game like Rayman Origins, while there is a high-tier goal of "saving the world from darkness", there exist sub-objectives in every level that help to form a memorable and varied set of experiences throughout the game.

The methodology of rational game design, as explained by this source, seems to confirm at least half of Mark JP Wolf's (2003, p. 49) assertion that games are defined by goals and player motives.

There are, in the cultural domain of video games, at least two readily available examples that seemingly challenge this idea: the open-world sandbox game and the so-called walking simulator.

Sandbox games (or games with sandbox elements), in short, are games in which the player is placed inside a most often open world (i.e. a game environment that is accessible in all or most directions at all times, as opposed to a linear progression) and, instead of being given clear objectives, is given a set of tools - usually tools for in-game creativity - and left to use them freely. The most popular game of this type, which, in one of its two game modes, is a pure sandbox, is *Minecraft* - about which the previously quoted Gamasutra article (Microsoft Studios, cited in McEntee 2012) article says the following:

Even in a game such as *Minecraft* where the player has free roam to explore and build whatever he wishes, he has goals that emerge from the game system that drive his experience in the game universe, such as building a mega-structure or stockpiling resources for later use.

It is arguable if the emergence of goals - which, if the sandbox is well-designed, is perceived by the player as having come from their own imagination - is the best way of phrasing why *Minecraft* (Microsoft Studios 2009; 2012) and other sandbox games are games.

Another example of a pure sandbox that is not called a game by its makers is *Second Life* (Linden Lab 2003; 2020).

Why is *Minecraft* considered a game while *Second Life* isn't? They both allow the player to set their own goals, and *Second Life* has a much wider array of possibilities about what those goals could be - since it allows for near-infinite customization of the game world and character.

Perhaps it is precisely because of that - because somehow the *designed* finitude of *what the player can do* in a sandbox indirectly prescribes the cognitive process of setting certain types of

goals, by the players themselves, that constitute *meaningful play* - in the words of the authors of *Rules of Play* (Salen & Zimmerman 2004).

Concerning why *Second Life* is not considered a game, we will look to what the quoted article goes on to say, quoting another article (not about *Second Life*, but useful to us in this context):

"...most game mechanics that don't feel deep enough feel that way because they have too many objectives and not enough meaningful skills." (Stout, cited in McEntee 2012). This could be an explanation, but again it seems insufficient.

Since the objectives in a sandbox are not given by the game, their number, their specificity and *the skills involved in completing them* are all functions of *what the player is allowed* (and encouraged) *to do*. In this sense, the almost complete absence of designed limitations to the interactivity of *Second Life* does not produce (nor does it seek to produce) skill-based interactivity, nor does it guarantee the impression that the player's / user's actions will lead to some form of perceived success or failure (we will touch on these two concepts in the following paragraphs).

The concept of skills, mentioned in the quote, deserves special attention. But before we get to it, we need to look a little deeper at what it means that the player *has something to do*. Since *doing* something involves willing action, it is impossible to *make* a player do anything directly.

Therefore, relying perhaps on the ideas of the school of behaviorism, game design seems to attempt to *condition the player's will* in the direction intended by the designer.

Many game designers and developers, such as the creators of the YouTube series *Extra Credits*, speak against the most extreme, unethical and ultimately unrewarding ways of employing the ideas of B.F. Skinner in game design in order to, ultimately, make money (Extra Credits 2012) - and we agree to speaking against those practices. But there seems to be much more to the behaviorist approach to game design than that: if we look carefully at the design of *any game whatsoever*, it seems we would have to conclude that it only succeeds to the extent to which it manages to guide the player's will towards an experience that makes sense (or in game design terms, that is engaging, or fun).

A few paragraphs earlier we mentioned skills, and the concepts of skills in game design needs to be understood at least as well as that of objectives.

According to the same article on rational game design, player skills (not to be confused with the in-game trope of character skills) can be physical, social or mental. This would seem like the broadest possible way of categorizing skills in a way that can be used to design games.

One article on the website textuality.org (Zimmerman & Clark, cited by Price 2011), as well as Jesper Juul's book *The Art of Failure* (Juul 2019, pp. 72 - 83) and other game studies sources usually identify three types of games: games of skill, games of chance and games of labor - with most actual games falling under at least two of these categories in different measures. There are definitely games (such as slot machines) where - at least if the game is being taken at face value - there are no skills involved. One cannot push the exact same button at the exact same game-moment with more or less skill. One can only push that button or not, and pushing it - regardless of when exactly as a moment in time - is the only way to progress the game.

It could be said that even such games create at least the impression of the existence of skills, such as how much to bet, when and if to withdraw the money etc. While in reality these are entirely arbitrary results of a random algorithm - or at least are presented as such to the player -, it is possible and highly probable that many players will play the game with the impression that some kind of control over the outcome is possible.

So, while designing in terms of physical, mental and social skills is certainly a good methodology for video games, it might not be universally applicable even to them. What seems instead to be applicable is what creates that illusion of skill, or of difficulty - *the fact that something is at stake* (be it real money or in-game credits in a slots machine or the resolution of a plot point in a narrative-driven video game).

We will return to this after having explored another, entirely different case of interactive works that lack the element of skill (and the accompanying elements of winning, failing and difficulty) while also not falling under the umbrella of games of chance - perhaps falling partially under that of games of labor, i.e. games where the player repeats the same non-skill-based action with the same result, accumulating progress for as long as the action is repeated (Juul 2013, pp. 75 - 79), but only on a very abstract level - while still being presented to the public as video games: so-called *walking simulators*.

Initially a somewhat ironic description for games where the only action is literally walking (and often some form of non-skill-based local interactions with elements of the environment, that serve to progress the story), the term *walking simulator* came to designate a number of carefully crafted, often emotionally and/or philosophically charged, character-driven, story-driven experiences that inevitably call for redefining what is and what isn't a video game.

One such walking simulator is the game called *The Beginner's Guide*, by Davey Wreden (Everything Unlimited 2015). Except for one brief moment towards the end of the experience, when the player-character can be killed if a certain action is not performed in a given time, there is no possibility of failing at the game. All the player has to do in order to finish the game is to follow the instructions of the narrator (and sometimes follow obvious, impossible-to-miss environmental cues) and go through the motions until the end of the game. However, this is not at all the subjective experience of playing *The Beginner's Guide*.

Because of the excellently crafted narration and the high-level concept of the game (a self-referential essay about game design and about video games as art - thus falling into both categories of the previous subchapter, video games and non-game interactive art, at the same time and without the possibility of conceptually functioning without either one of them), the player constantly *wants* to progress, and arguably cathartic moments are created *by the player's action* - action which has no influence on how the game progresses, but which *seems* to have such an influence because of the narrative. When one of several lines of dialogue is chosen by the player, the outcome will ultimately be the same regardless of which one it was - but the *meaning* perceived by the player through having *chosen* to "say" that thing, and not any of the others, is *something that could not have been delivered through a passive art form*, such as film.

One conclusion to be drawn from here, that is relevant to the thesis, is that *games generate meaning through the player's own action* - and, of course, through the feedback of the system to that action, which feedback sometimes involves other players; but that feedback itself is only meaningful because it is triggered by the player's action and because it invites the player, in most cases, to another subsequent action.

To go to an unnecessary extreme, it could be argued that walking simulators require the skill of in-game walking. That would be a physical skill linked to game literacy or computer literacy,

and to put it in rational game design terms, since most players are literate in video games - and those who aren't will very quickly learn the extremely simple controls - the difficulty level of this skill is set to zero. Perhaps increasing the difficulty of such a game - if indeed it was focused on actual walking as a skill-based mechanic, which a game like *The Beginner's Guide* is not, beyond the ironic genre-name - would mean mixing up the controls, or in some other way asking the player to figure out how to get the main character to walk. Such a mechanic, for example, is being implemented in the work-in-progress game *The Secret* by Cristian Dragomir (UNATC 2020); in that game, the player-character's walk cycle is controlled not by WSAD or anything equivalent, but by alternately clicking the mouse buttons to move each leg - and it gets progressively harder as the player-character suffers a gradual loss of mobility; perhaps this is the only sense in which a game can be called a *walking simulator* unironically and with real relevance from a rational game design perspective.

Still, since the objective is singular, purely narrative, and virtually no skill is required, the cited principle of skills matching objectives seems to hold for *The Beginner's Guide*.

But since we have proven that not all products that are labeled and accepted as video games rely on skills, we will need to look at what remains, in the case of those that don't, of the rational design framework.

And what seems to remain is the objective, which, as was already noted, is of a purely narrative nature and cannot technically be "failed" - except by not wanting to play the game. And this last part of the sentence is more relevant than it seems: because ultimately, as we concluded in the case of sandbox games, here too it all comes down to is *what the player wants* and, from a design standpoint, to getting the player to *want what the designer wants them to want*, i.e. what progresses the game, what *generates meaning*.

Skills and mechanical (as opposed to purely narrative) objectives, i.e. objectives that can be failed are one way of achieving this conditioning of the player's volition, but not the only way. And it seems to be achieving this that matters.

Wanting to do something will immediately put something at stake. *Wanting* to do something gives meaning to that something and to its entire context (i.e. the game); and it necessarily comes with (at least the illusion of) the possibilities of success and failure. But even if no such real

possibility of failure exists, like we saw with the last example, the *impression* (coming from narrative, worldbuilding etc) that there is something at stake is enough to make that action relevant to the player, to make the player *willingly seek* to do it. Again, *it is the player's own volition, and nothing else, that fundamentally drives any game's progression.*

In this sense, if a way of designing for the player's volition is created that does not involve objectives or skills, then the result will still be a game. But it seems impossible to cause the player to *want* something in the game without creating, as explained, at least the illusion of a win and a fail state.

“Objectives are all about what the player perceives as the purpose of his existence in the game world, and the feelings which the designer wishes him to associate with this experience.” (McEntee 2012).

So it could be said that objectives (in the broad sense explained above) are one of the fundamental units - if not *the* fundamental unit - of the grammar of game interactivity. And, if we understand properly the necessity of objectives (again in that broad sense) for *directing* interactivity of any kind (in the theatrical and cinematographic sense of directing) - since, as we observed, getting someone to act upon a system requires getting them to *want something* from it - it follows that indeed a universal grammar of interactivity is being researched and developed by game designers, and that, as the hypothesis stated, it can be applied to any creative field.

And that, while the conceptualization of its constituent units as defined in rational game design (win/fail states, skills, difficulty) can perhaps be done differently, what remains essential to this grammar, to this language we sought to identify, is that it involves *directing not just for the audience's attention* (like non-interactive forms of art do) *but for the player's volition.* And that the main place, so to speak, where meaning is formed is in the interaction, but much more specifically, *in the moment of action by the player.*

The theoretical research could go on with various examples, were it not sufficient for the needs of the present thesis. Two video games that very clearly illustrate what is meant by generating meaning through the player's action itself are *Spec Ops: The Line* (2K Games 2010) and *Pathologic 2* (tinyBuild 2019), and the reader is encouraged to look into them.

Having established two key elements of the language of video games that seem to entirely apply, as indispensable, to all forms of interactive art (namely *design for directing the player's volition* and *formation of meaning through the player's action itself*), we will briefly clarify a few things that, according to the logic of this research, are *not* necessary not sufficient for a work of interactive art to be a video game: video game aesthetics, specific hardware, and established game-genre mechanics. The denial of these as necessary for a game is important to the practical part of this study.

By video game aesthetics we mean a number of things, most of them intertwined with genre mechanics, from the representation of "health" or "lives" (both of them game-genre mechanical tropes) with a heart symbol, to any and all J.R.R. Tolkien / Dungeons & Dragons based elements of fiction in many role playing games, to placing weapons on the sides of the screen in a first person shooter, to the mostly standard set of animations in platformer games, or even to something like the concept of a tutorial, or worldbuilding via in-game item descriptions. Needless to say, after the exposition of what a game really is, why these do not make something a game. An interactive product can have any number of these while intentionally not being a game (as is the case with the use of game aesthetics in various interactive art installations), or have none of these while being entirely a game (as will be hopefully the case with the project that makes the object of this research). These aesthetic tropes seem to serve in appealing to an audience that most designers - the author of this paper included - identify with, and thus in reinforcing (or changing, to the extent to which these tropes are challenged) the habitual limits of *video game culture* rather than of gameness itself.

The hardware is an interesting point: most if not all games are designed for one or several of a number of pre-defined sets of inputs and for a specific *platform* (i.e. the device on which the game runs), these two being generally interdependent. This leads to many if not all game genres and standard game mechanics being the result of the hardware. Strategy games are generally made for the mouse (or more recently for the mobile touchscreen, but used somewhat like a mouse), flight simulators are ideally played with a joystick, quick-reflex console-based action games are designed for gamepads etc. This has led to a lack of variety in patterns of interaction, which the open field of interactive arts has never encountered - because unlike creations within

said field, video games are generally put out as commercial entertainment products. This, again, becomes an inevitable part of not just their aesthetic, but the *meaningful play* itself, and we are not at all against this. We do however seek to disconnect the abstract notions of what makes something a game - and the *meaning* resulting from playing it - from all of these, by designing not with a certain hardware setup in mind, but starting from a supposed all-possibility.

Using *any* hardware setup with the principles of the language of interactivity in mind, with the purpose of generating meaning through interactivity itself, will, if we are not wrong about the hypothesis of this research being correct, ultimately result in creating a game.

Lastly, video game genres and the many mechanical tropes belonging to them (from the left-to-right side scroller to the first or third person shooter to western and Japanese RPGs and from throwing objects to distract an enemy as part of the stealth mechanic to the standardized concept of enemy itself, to saving the game, checkpoints, health, stamina, items, standard game control schemes like WSAD and countless others) - which often extend into the visual and the narrative - are nothing more than patterns of interactivity that have been created by certain developers at certain points in time, often as a result of hardware or software innovation. Without claiming to say anything new, we will remind the reader that the concept of *clone* in video games (i.e. a game that borrows mechanics from another game) is not far from the concept of game genre; that most if not all genres, although they might be natural results of hardware and software affordances, are ultimately series of clones of previous games. There doesn't seem to be any reason, other than hardware or software impossibility of creating something new, why a work of art *must* belong to one or more game genres in order to be a game.

To conclude the first chapter, it seems to make sense to further analyze the aforementioned, seemingly very minor game moment from the game *Enslaved* (BANDAI NAMCO Entertainment 2013), that was mentioned in the subchapter about the audiovisual.

That game moment is one of many instances where one could say that elements of *performing arts* (more traditionally, theater) - rather than film - are used in a video game to generate meaning. However, this is not entirely the case, for at least the following two reasons:

Firstly, and most obviously, the metal debris do not (seem to) physically threaten the player, but only the player character; the game is played in a third person view (i.e. the camera follows the player character) and it makes heavy use of extreme cinematographic angles, so it is safe to assume that there is no intention of creating anything equivalent to a subjective angle by visual means. What happens is a kind of character-identification, of fictional experience by proxy, that is unique to video games and that results from a meaning-generating device that is itself unique to them: the player-avatar (the specific and unique representation of the player in the game world; usually a character, but not always). Therefore, the theatrical element, just like the cinematographic one, can be seen to have informed the *mise en scène*, but ultimately the channel by which the emotion is created belongs to neither of them.

Secondly (and this is the most important point here), the moment works as intended because the player *wants to do* something, namely escape the ship (from a narrative point of view) or simply progress through the game (from a mechanical point of view). To maintain the performing arts analogy, the stage is set in such a way that not only is there interaction as a central element but the audience's *volition* is set on a course determined by the authors (with the inevitable accompanying feeling of *something at stake* within the fiction) and the meaning of the interaction is entirely built and centered around this; not just around the audience personally, but around the audience *wanting to do* something that makes sense in the fiction, and that constitutes the driving force and primary channel of meaning-making for said fiction. If this kind of setup was to be created in a performance, *that performance would become, technically, a game*. Not a *video* game, but a game in the most essential sense.

III. Practical approach in *U Pilot*

Large portions of the text of this chapter are reproduced, with minimal adaptation, from the game design document of the project being discussed.

III.1. The project

III.1.1 General description and core mechanics

U Pilot is a mechanics-based project that researches the use of *real-time breath input in virtual reality* to create new gameplay interactions. It does not seek to build upon known video game genres, for reasons previously explained.

For the purposes of audience targeting, visibility etc as well as for conceptual coherence, it will be presented to the public, at least in its earliest forms, not as a video game but as an interactive installation / location-based experience. It is, however, entirely based on core principles of video game design as identified in the theoretical part of this thesis.

Aesthetically it is an abstract, atemporal experience that intentionally does not use any words or other explicit symbolic signifiers. The interaction is, as much as possible, self-sufficient.

There is no narrative in any traditional sense.

The setting can be experienced as a representation of outer or inner space, but no such interpretation is necessary to understand the game.

The player-character is undefined (to maximize immersion) and there are no other characters.

Breathing is the only input method, other than the position of the headset. This is currently done via the use of a device called a respiration belt sensor, manufactured by the company NeuLog.

The player is surrounded by a mass of transparent lightclouds of distinct colors. These are breathed in, the colors mixed, and clouds of the resulting color breathed out. Each discrete lightcloud is of only one color; when not breathed in, it will, after a while, split into a number of lightclouds of the original lightcloud's component colors. Being completely surrounded by

"white" (i.e. colorless) light causes the player to slowly ascend, the mass of lightclouds ascending with them. When the colorless lightcloud directly around the player breaks because of how the player breathes, the movement reverses and the player falls back towards the ground, somewhat faster but eventually landing smoothly. There is no player avatar movement in the game space other than this and the movement of the head. The colorless light is formed relatively easily, and the player should not be concerned with matching colors. The required "skill" is maintaining an overall optimal breath pattern, which the game never measures directly but instead converts into a direct feedback response through the color interaction.

There may or may not be implemented a point of altitude after which the colorless light becomes un-transparent and almost-blinding, where the ascension technically stops. If implemented, this point can be maintained indefinitely or can be descended from, both of these through the player's breathing.

Conceptually, and staying fully within the domain of signifying-through-interactivity-itself (interactivity which by its nature *includes any interpretation of any feedback or other output from the game*, therefore it includes any conceptual understanding of the game itself, conceptual understanding which ties back into the interaction *immediately, through the breath*), the game aims to somewhat subvert the escapist use of the escapist drive habitually associated, to various degrees, with different forms of art or entertainment and with video games in particular (as well as VR), by using the extreme stimulation of the senses as part of a willfully controlled feedback mechanism, i.e. a game mechanic, that ultimately leads, *mechanically*, to embodied presence and perhaps even introspection.

What has been described here is the current scope of the project, as a mechanical demo. Further in this text there will be references to other mechanics based on the same controls. These are to be introduced in later stages of the game's development. Any references to the game's "levels" in this text are about those different mechanics, accompanied by considerable changes in the contents of the game world - but the word "levels" is only valid from a design point of view - the player will perceive seamless transitions back and forth between the different phases of the game.

On the location of the so-called installation, the game will be running on a PC equipped with an Oculus Rift or Rift S, with the NeuLog Respiration Monitor Belt connected to it. The player will put the respiration belt on, then the headset, entering the already-running game.

The design of the physical space is not of concern in the current stage of development; it will be covered in later versions of the project. What is sufficient for now is to state that conceptually, the space will have a minimalistic design aimed at creating immersion in the VR experience without providing any clues about its contents before entering it and without adding any additional meaning to it. Most likely it will be a slightly raised black platform with the headset and respiration belt in the center, a laptop hidden underneath or above or elsewhere and the walls and floor covered with black fabric, with minimal lighting to allow the user to see where the devices are before going in.

A possibility exists that a secondary game will be developed, with an almost identical algorithm of mixing colors but taking place in a 2D hexagonal grid represented on a computer screen. This second game would have different objectives, different mechanics and a different progression, being much more abstract. Because this is a side product, we will not expand upon it for now.

III.1.2 Design principles

There are several precise points that are being aimed for in the design of *U Pilot*, points which we will call the *design principles* of the project. These are: no use of words other than the title (which does not appear in-game), no visual/auditory/other signifiers used to explain the interactivity, no storage of breath input data (with one exception) or direct qualitative interpretation of the breath other than the real-time measurement input from the NeuLog device, never marketing the work as a “serious game”, and keeping all forms of progression/regression instantly, organically and exactly reversible.

We will take these one by one, expanding upon each one of them.

There must be no written or spoken words, neither in the game nor in the location. If minimal written or verbal instructions for using the breath sensor or help in physically equipping it will be

necessary, those will be provided. Such instructions must not cross into describing or explaining anything about the game, the installation or the concept.

All tutorial elements and environmental storytelling (in future, more complex versions of the game) will be given purely through playing, through interactivity itself.

The breath is never evaluated by any criteria, everything happens in real-time as a result of the relatively complex feedback system that is the game logic (the interaction between the breath and individual colors, and between the colors themselves).

There is one essential part of the algorithm behind the core mechanic that requires the game to constantly store the breath input data from a single specific past frame, which is overwritten every few frames. Other than that, no breath data is ever stored.

Since no data is stored, no direct statistical evaluation of the breath is possible. The "meaning" of how the player breathes is at all times hidden, so to speak, from the game algorithm itself.

A future phase of the project's development will require experimental studies. Those studies will involve storage and analysis of breath input data, but that will be done separately from the game's code and none of it will be a part of the final product.

Although the game is designed to obtain side-effects that are beneficial from a psychological and perhaps medical point of view, it is not to be marketed as such. Derivative uses and repackagings of the core mechanic are encouraged, but they will constitute separate products.

Every algorithm that results in gameplay progress (i.e. every win state at any degree of granularity) can immediately reverse, as a result of the player input no longer triggering that progress (i.e. as a result of the corresponding fail state), into the exact, organic opposite - and vice versa. This means that there are no "points of no return" in the game.

The game will have levels in a sense, as explained before, but the player can endlessly move back and forth between them points, switching the direction at any moment through how they interact with the system.

III.1.3 Scope of the project

The entire project, probably taking several years to develop, is a complex and fairly content-rich experience that will carry the player through at least three so-called levels (i.e. sections with different mechanics, all based on breathing, and with different environments).

The current milestone is to have a fully functional and aesthetically polished demo of the core mechanic, as described in the first subsection of this chapter (mixing colors that leads to ascending or descending).

Currently, the prototype exists in an almost completely functional form (with minor bugs and with several elements of the deep algorithm requiring redesign) but with placeholder assets. The intention is to have this functional demo complete in a few months, then to proceed to conducting playtests as scientific research, aimed at correctly calibrating the game's design parameters (and, if necessary, adding or removing game logic) to make sure that the intended experience takes place for all potential players.

Once this is done, the demo version will be made available to the public (as an installation) and development will continue on further, more complex parts of the game.

So far this has been a solo project for the most part, with invaluable advice in the various departments having been received from programmers, VFX artists, game designers, sound designers and composers and other professionals.

The only aspect of the current prototype that has been outsourced is the sound. The sounds currently in use have been created in Logic Pro by Aurel Ciucur, and then imported into Unity.

Other than that, it needs to be mentioned that the code for the very first version of the 2D prototype of the game was entirely written by Romain Lallemand, based on the initial design document. That version has then been replaced, but his help has been and definitely will be essential in solving specific issues with the increasingly complex code.

In the immediate future the project would benefit from the hands-on help of a professional VFX artist and that of a 3D artist, as well as from replacing the current recording-based sounds with a live sound generation algorithm that responds to in-game events. It is also possible that one or more programmers could be invited on board.

III.1.4 Relevance of the project to the present thesis

As it was already explained in the theoretical part of this paper, and made clear by corroborating this with the aforementioned design principles of the project, what is sought is to separate the essence of what a video game is (or of what game design studies and aims to create) from all the cultural commonalities of the “video game” label, from hardware input methods to game mechanics. To put it differently (saying essentially the same thing) the purpose is to create a work of interactive art that, while not positioning itself as a game in any way, seeks to prove in practice that game design principles are the key to generating interactivity that is meaningful and engaging in and of itself. That, as it has been already said, what game design truly studies is the essential, natural cognitive language of all forms of interaction with systems.

To repeat what is also written in the introduction, the design process of *U Pilot* did not start from the hardware innovation of using a respiration belt as a controller, but from removing the conceptual limitations of what can be done in a video game, beginning with those that pertain to hardware.

III.2. The current stage of development

III.2.1 What works

The algorithms that govern the interaction between the player and the lightclouds via the breath (including interactions between lightclouds) is entirely functional in the form in which it has been laid out in the current design document - save for some relatively minor bugs.

III.2.2 What doesn't work (from the implementation and from the design itself)

The current way in which the clouds are rendered, which is a placeholder (small, with a lot of space around each cloud, and using the most basic particle system available in Unity), does not create anything of the intended experience. The aesthetic aspect of the clouds is currently not

fixed in the design - but what is fixed is that they should be entirely transparent (in such a way that layering them in perspective does not add up to opacity, but also that they are opaque enough to feel very present) and of considerable size, so that there is no pixel around the player that is not occupied by their colors.

The current sounds (the sound assets themselves, not the implementation) are aesthetically valid but still in a sense they are a placeholder for the intended real-time-generated sound.

The implementation of the sound is lacking, probably because of the very basic sound component built into Unity. For the next iteration, either with the same sounds or with the real-time-generation system, a middleware such as fmod will be used.

The biggest problem is with the current design:

For the most part of the development process the prototype had the form of a 2D grid (which is the logical form used by the algorithm behind the particle clouds placed in the 3D space around the player, in the game). The cells of this grid do not actually move - instead they are instantaneously replaced to be able to implement and test the logic of how cells are added to, removed from, or rearranged within the grid. Also this 2D grid had no forward direction, the effect of the breath being radially symmetrical from the central position (where the player-avatar technically is).

Considering that the initial design only took into account the logic of this grid and not the challenges (to this logic itself) that have appeared with the introduction of 3D movement and 1st person view, some changes, quantitatively small but of crucial importance, will have to be made to the design to achieve the intended functionality without bugs. The design necessities created by these two additions will be detailed below.

III.2.3 What is yet to be implemented (for a polished public demo)

The 3D assets need to be created and implemented: the clouds themselves, the terrain, the sky and possibly (as details in the environment design will gradually change) other non-interactive or indirectly interactive objects to serve as visual cues that allow the core mechanic to be perceived.

The sound generation algorithm needs to be created and implemented.

VR needs to be implemented and the environment (possibly also aspects of the interaction) redesigned to maximize presence in VR.

III.2.4 What the initial design seems to be lacking

What has so far proven lacking (not incorrectly designed, but completely absent) from the current design of the demo level is precisely an essential part of the game element discussed at length in this paper. Specifically, while the interaction does move the game system towards one of two opposite states (ascending and descending), there is no element that makes the player ascribe any positive or negative value to them, that is, to seek one and avoid the other. If this was intentional it would have to serve a purpose, to create a specific impression or effect - but it is not intentional, rather it is the result of having oversimplified, for the demo, the mechanics designed for the other levels - but of having oversimplified them to the point where the only element left that can be discerned as signifying progression is an expected spontaneous association of flying up with success and of falling back down (to the initial position) with failure - without having a target to fly towards or a threat to fly away from. There are many ways, some more subtle than others, in which this could be addressed, but not addressing it seems to create an experience that feels relatively random, in which player action and game system feedback do not necessarily tie into a game loop because the feedback fails to *generate the meaning*, in the sense explained here, that would make the player form an intention coherent with the game system.

One proposed addition that could easily help in this direction would be to add, somewhere in the sky above the player, not just an object but an *event*, an object that undergoes a specific change - one that progresses and regresses in response to the player's ascension and descension, and the complete progression of which, coinciding with the player having reached the object - or a point that is very discernibly connected to the event in some way - needs to be something that the player would intuitively seek.

In this regard, the design principle that forbids words and that that forbids non-interactive symbolic signifiers that would explain the gameplay are to be observed.

A major thing that is lacking which has to do with how the addition of 3D movement to the prototype changes the design is a visually and mechanically believable (not immersion-breaking) way of handling what happens with clouds that are being moved by the breath when the direction of the breath changes while they are still moving (i.e. long before having reached their destination).

III.3. Directions of development in the near future

Other than fixing all of the problems listed in the previous section, including those that require changes or additions to the game design or environment design, what is to be done is to test and polish all aspects of the game (where by test is meant both testing for bugs and playtesting, i.e. evaluating the player experience in order to polish the design) so that the demo can be made available for further, public playtesting in early September.

Again, it is to be kept in mind that playing the game should spontaneously, even if not consciously, prove the point that game mechanics (in a somewhat more flexible sense than that used in rational game design) are the essential framework of the art of interactivity.

IV. Conclusion and long-term intentions

While the theoretical research so far (based only on relatively brief incursions into the fields of film studies, interactive art studies and of course game studies) seems to have yielded fruitful results, it requires substantially wider and more in-depth explorations of those fields as well as many others, such as individual arts, philosophy or the transdisciplinary evolution of art itself and of the relationship between art and technology, both practically and conceptually. The latter direction will also involve, as it was already mentioned, a future scientific study about how the breath of different people interacts with the game, study aimed at fine-tuning the design, and for the conducting of which it will be necessary to collaborate with scientists and technicians of various disciplines.

Having established that *there is* a universal language of interactivity to be found through the study of game design - a discipline most thoroughly developed and popularized as part of video game development but being, on the level of principles, the design of any and all kinds of games - the most important direction of deeper theoretical research should be to attempt to establish precise elements and structures of that language in ways that can be applied disregarding any cultural and aesthetic particularities of video games, board games or anything else explicitly labeled a game at this or any other conceivable point in history.

The practical development of the project, as outlined in the previous chapter, will start with the polished public demo due hopefully in September then continue, most likely over the course of 2-3 years, with expanding the game into the much larger and more complex experience, involving more than one breath-based game mechanic, different environments, A.I. and a (highly abstract) minimalistic narrative progression - all of which are outlined in the original game design document.

The intention is to develop both the practical and theoretical aspects of this research into a doctoral thesis.

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