PUZZLINGUISTICS: A TYPOLOGY OF LUDIC LANGUAGE BASED CLUES FOR IN-GAME PUZZLES IN ROLE-PLAYING GAMES

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ABSTRACT

Hundreds of role-playing video games have been produced since the creation of the first title of the genre, *Dungeons and Dragons*, in 1974. These titles incorporate one common feature in the genre, puzzle. In designing a puzzle which primarily revolves around its major element which is clue design, language contributes to the playfulness and playability of the game itself. This study attempts to explore the roles of ludic language in designing clues with regards to the user's functions of the games. The study employed Crystal's ludic language, Danesi's puzzling language, Caillois' *ludus* theory, Huizinga's play function, and Aarseth's user functions on twenty-three role playing video games or commonly abbreviated as RPGs and their sub-genres. The study further proposes a typology of clues. This typology comprises clues which are orbital, conditional, collocative, referential, indicative, reflective, reversal, and signalling. Game developers could employ the results of this study as a consideration in designing puzzles in video games especially role-playing video game genres.

Keywords: ludic language; puzzle; clues; role-playing games; user's functions

Introduction

Puzzles, as Danesi (2002) suggests, have always been integral to adventures. From the mythic wisdom-seeking riddle contest between Odin and Vafthrudnir to the life-and-death puzzles Alice must solve in Carroll's Alice's Adventures in Wonderland, puzzles play a significant role in shaping the character lores. In role-playing games, puzzles assume a central role, differing only in the interactive nature of games.

The interactivity of video games prompts designers to consider what Caillois (2001) terms as *ludus* or structured play, and what Huizinga (2014) refers to as the play function. The former dictates how a game is to be played, while the latter governs playability and the playfulness of a game. Therefore, all elements of a game, including puzzles, must adhere to these considerations. When it comes to puzzles where language serves as both a medium of instruction and storytelling – functioning as both a mechanic and a narrative – the design of in-game puzzles must address these dual concerns. The following riddle, taken from Ubisoft's Assassin's Creed: Valhalla, serves as an example to illustrate this point:

Havi:	*You are not drinking, Gunlodr.*
Gunlodr:	*I do not care. Drink is the heron that steals away one's memory.*
Havi:	*Some would say it frees the spirit of worry.*
Gunlodr:	*We call those people drunks.*
Havi:	*I see your wit as sharp as your intelligence*
Gunlodr:	*Wit? I was simply stating the truth.*
Havi:	*Let us play a game. Ask me some riddles. I will see if I can guess them.*
Gunlodr:	*I enjoy a good riddle. How did you know?*
Havi:	*All great minds enjoy riddles. You fashion order from disorder, sense from nonsense.*
Gunlodr:	*You have me at that. Very well, I will play.*
Havi:	*Give me an easy one to begin.*
Gunlodr:	*Would that I had now what I had yesterday. Find out what that was. Mankind it mars, speech it hinders, yet speech will it inspire.*
Player:	*a. Courage* *b. Ale* *c. Gold* *d. Can you repeat the riddle?*

The puzzle is designed to allow players to decipher the Gunlodr riddles. The puzzle is constructed by providing clues and distractions. The clues are in the form of a pre-riddle dialogue. The dialogue preceding the riddle revolves around Gunlodr's dislike of alcohol. On the other hand, the distractions take the shape of choice a, b, and c that share similarities in the implied meaning. The three choices are what defines Norsemen or the Vikings and the cultural background of the story. These choices are morphosemantically related to "mar" and "hinder" with "inspire" as the distraction. The players have to consider these three words. Players might also think that a dialogue about drinking alcohol is a distraction from which they will not select

the choice of an "ale". However, if the players pay attention to the words "mar", "hinder", and "speech" and relate them with the clues, they will select "ale", the correct answer.

The example of Gunlodr's riddle signifies how an in-game language use has to consider the players by treating any lingual elements as a mechanic and as a narrative of the game. The fact that the riddle has an option of Gunlodr's repeating the riddle and a level of difficulty, as implied by Havi's saying to give him the easiest one to start with, also points out the mechanical aspect of in-game language use in the context of puzzle design. Studies on in-game language use which address the issues of puzzle design with concerns to the roles of lingual elements in the construction of clues were undertaken. Previous studies on the roles of language in puzzle design revolve around puzzle typologies and their corresponding elements (Danesi 2002; Shokeen et al. 2020) and puzzle for language learning (Avinash 2016; Levine et al., 2012). On the other hand, puzzles in video games are studied around their lucidity (Liang 2012), situatedness of speech (Gorniak & Roy 2005), visualisation (Nguyen et al., 2021), clue system from player's behaviour perspectives (Wauck & Fu 2017), and the impacts of clues in educational games (O'Rourke et al., 2014).

Departing from the gap left by the previous studies, namely, puzzle design with the focus on clues from the perspectives of language play, *ludus*, and user functions, this study attempts to construct a typology of clues. To construct the typology, the theory of ludic language by Crystal (1998), puzzle language by Danesi (2002), and user's functions by Aarseth (1997) were adopted to serve as foundation bases.

Ludic Language, Puzzles, and User's Functions in Role Playing Games

Role-playing games (RPGs) are inherently story-driven genres, where narratives profoundly influence gameplay. Fernández-Vara (2011) introduces the concept of indexical storytelling in RPGs, emphasising the integration of verbal and non-verbal elements (visual, audial, and operative) to not only convey the story to players but also engage them actively in navigating the narrative. Puzzles serve as crucial elements of this engagement. Through this type of storytelling, every object is treated as a device that tells a particular narrative. This narrative treatment, which Prakoso et al. (2023) term as "pygmalionisation", requires gamers to carefully explore the game world when it comes to solving the puzzles.

In puzzle design, it is essential to structure puzzles to generate play functions, as outlined by Huizinga (2014), where playfulness and playability are central concerns. Aarseth (1997) categorises the delivery of playfulness and playability as user functions, encompassing interpretive, explorative, and configurative functions. These functions with regards to puzzles are tied in with quests. Howard (2022) indicates that puzzles are inseparable from quests implying that quest types might define and signify the puzzles. Quests focusing on world exploration might have different puzzles from quests emphasising on character immersion. This further implies that ludic language applied on the puzzles might possess different characteristics.

Ludic language, as defined by Crystal (1998), focuses on signifying the ludic values of language within the context of puzzles. It defines the game by establishing rules through lingual elements. Therefore, the lingual elements of puzzles must incorporate user functions to define and signify playfulness and playability, giving each puzzle distinctive challenges via the design of clues. In the context of quests, clues of each puzzle might be dependent not only on the quests but also on the sub-genre of RPGs. The distinctiveness resulting from different fashions of playing games and narrative immersion are expected to generate what Fjellestad (2021) calls ludic impulse. Through these impulses, different experiences in dealing with the puzzles are expected to occur.

Clues in RPGs, according to Barton and Stacks (2019), guide players to complete games through in-game stories, printed manuals, or intertextual references. In-game story clues work mechanically and narratively, printed manuals offer explicit details, and intertextual references establish connections with narratives from other games. The first and third types of clues are laden with distractions to enhance ludic engagement and replayability, while the second type, due to its explicitness, tends to minimise distractions.

Ludic engagement in video games, as studied by Lindley (2004), is connected to immersion of the gamers into the game world. Thus, to ensure that the engagement is continuously preserved, flow, a term introduced by Csikszentmihalyi (2014), has to be managed in order to make the games neither too easy nor too hard. The same principle also applies to the design of clues.

Methodology

The data of this qualitative study are in the forms of verbal and non-verbal information as captured from in-game puzzles. Non-verbal information encompasses visual, audial, and operative elements of the information perceived from the analysed puzzles. The data were taken from RPGs and their sub-genres (Table 1).

Table 1

Data Sources

Game Titles	Publishers/Developers	Sub-genres of RPGs
Assassin's Creed: Valhalla	Ubisoft	Action RPG
Breath of Fire IV	Capcom	RPG
Devil May Cry 3: Dante's Awakening	Capcom	Action RPG
Dragon Quest XI	Square Enix	JRPG
Final Fantasy VIII	Square Enix	RPG
Final Fantasy IX	Square Enix	RPG
Final Fantasy X-2	Square Enix	RPG
Final Fantasy XVI	Square Enix	Action RPG
Middle-Earth: Shadow of War	Warner Bros Interactive/Monolith	Action RPG
Metal Gear Solid	Konami	Action RPG

Metal Gear Solid 3: Snake Eater	Konami	Action RPG
Pokémon Arceus	Nintendo/Game Freak	RPG
Star Ocean: Second Story	Square Enix/Tri-Ace	RPG
Suikoden	Konami	RPG
Suikoden II	Konami	RPG
Suikoden III	Konami	RPG
Suikoden IV	Konami	RPG
Suikoden V	Konami	RPG
Tales of Arise	Bandai Namco	RPG
Thousand Arms	Atlus/Red Company	RPG
Valkyrie Profile	Square Enix/Tri-Ace	Action RPG
Wild Arms 2nd Ignition	Prokion/Media Vision/Sony Interactive Entertainment	RPG
Xenogears	Square	RPG

The data sources on Table 1 were selected based on puzzles which are featured in character immersion, exploration, or equipment finding tasks. The first criterion refers to puzzles that will immerse the gamers into the narratives through their interactions between the controlled characters with other characters who occasionally are hidden in the game world. The second criterion refers to the emphasis of directing gamers to the world setting of the games through puzzles. The third criterion refers to puzzles, if solved, will grant the gamers new and powerful equipment that might assist the gamers in engaging the games. It was expected that the typology would be constructed in a comprehensive fashion due to the various characteristics of the clues. The data acquired were analysed by applying the theory from Spradley (2016). Four steps were taken to analyse the data.

The first step was domain analysis. In this step, puzzling language theory by Danesi (2002) was implemented to reveal which ones belong to puzzles and which do not. Once completed, the second step known as taxonomic analysis commenced. In this step, the theory of user's functions by Aarseth (1997) was applied to reveal whether the puzzles along with the clues belonged to interpretive, explorative, or configurative functions. Componential analysis proceeded next. In this step, the theory of ludic language by Crystal (1998) and *ludus* of Caillois (2001) were implemented to reveal the structurisation of clues as a part of the puzzles. In the last step, finding cultural theme, a typology of clues was presented based on the findings of the previous steps. To indicate the analytical aspects of the typology, game premises were employed. The premises incorporated logical relationships of two objects called "a" and "b". Their relationships were premised based on the types of clues found. Through the premises, logics behind the naming of each clue type was expected to generate more comprehension.

Findings

The findings indicate that there are eight types of clues, namely, orbital, conditional, collocative, referential, indicative, reflective, reversal, and signalling. The differences that set these eight clues apart are the premise of the ludic mechanics, further illustrating how the clues operate (Table 2).

Table 2
Clue Premises

Clue Types	Premises	Explanations	User Functions
Orbital	a is there for b	Relying on core and satellite relationship between words appearing on the puzzles	interpretive
Conditional	if a, then b	Relying on logical conditional expressions and consequences	configurative
Collocative	with a comes b	Emphasising on the pairing of verbal and non-verbal expressions	explorative
Referential	a refers to b	Relying on employing hidden in-game references in solving the puzzles	explorative
Indicative	a is a until it becomes b	Emphasising on the use of game mechanics as a clue delivered through verbal expressions	configurative
Reflective	a can be changed with b	Relying on connotation and denotation in tandem with particular game mechanics of the game	explorative
Reversal	a comes after b	Relying on reversed logic	configurative
Signaling	a signals b what to do	Emphasising on the use of narrative as a cue	interpretive

Through the premises, the *ludus* or structured play is built, further indicating that ludic language is of in-game use. The use of ludic language is primarily perceived from how lingual expressions are made in tandem with game mechanics to establish a distinctive structure differentiating it from the other structures of puzzle. The following sub sections will elaborate on each clue in detail.

Clue Typology

The existence of a clue in puzzle design, as suggested by Schell (2008), is a required condition to cognitively incite the minds of the players that the puzzles are solvable. Therefore, any forms of clues, either in verbal or non-verbal expressions, are a must-have companion for any puzzles in video games. The details of each type are explained. Table 3 shows the orbital clues in Bandai Namco's tales of arise.

Orbital

Orbital clues are clues which operate under the premise of "a is there for b". These clues indicate that there are words functioning as satellite and a word functioning as the core to which the satellite orbits. The order of the words follows the rule of general to specific relationship.

Table 3

Orbital Clues in Bandai Namco's Tales of Arise

Quest Name	Puzzle	Object	Clues	Satellites	Core	User Function
The Mysterious Pair	Finding a hidden instrument somewhere in the game world	a place	Just beyond the hovels in a land shrouded by sand and stone	Sand Stone	Hovel	Explorative
			The northernmost reaches of a wasteland to the north of an abandoned village	Northernmost Wasteland	Abandoned Village	
			It lies dormant at the back of a narrow road to the west, whereupon an ancient tower stands	West Ancient Tower	Narrow Road	

The quest asks the players to locate an item somewhere in the world called Dahna. Three clues are given, and each clue has two satellites and one core. When the cores of each clue are combined, a structure of meaning is found. Hovel, besides denoting an establishment with a simple construction, also refers to a building with conical shape. This is a visual clue to the place in the wasteland called Iglia Wastes of which the map is conically shaped. Comprehending these clues, the players could start exploring the area to find the hidden instrument.

In its simplest form, orbital clues would usually have visual assistance that functions as core. Many RPG titles like Square's *Xenogears*, Square Enix's *Final Fantasy XVI,* Konami's *Metal Gear Solid 3: Snake Eater*, Prokion's *Wild Arms 2nd Ignition*, and Tri Ace's *Star Ocean 2nd Story* employ this orbital form. This simplest form of orbital tends to be employed when the reward of the puzzle is deemed necessary for the gamers in order to make progress in or to ease them into the games. In Capcom's *Breath of Fire IV*, to get Grass Dragon or Cho Ryong, gamers have to follow a shining bird in a plain (see Figure 1). The game automatically

displays the shining bird as the gamers enter the plain. The only distractor generated by the puzzle is the fact that it is a bird, the gamers would have to keep a distance from the bird or else it will fly away.

Figure 1

Orbital Clues with Visual Assistance in Capcom's Breath of Fire IV

Conditional

Conditional clues operate on the "if a, then b" basis either between verbal or non-verbal expressions. The clues of this nature are rather scarce of information. The scarcity of the information indicates that the distractors might be fewer to none compared to orbital, but the scarcity compels the players to thoughtfully decipher the limitedly expressed clues. Conditional clues are formulaically found on boss battle sections that demand a wit from the gamers to beat them in creative ways. One of the examples is Capcom's *Devil May Cry 3: Dante's Awakening*. In one of the boss battles, gamers must battle a Greek mythological hound, Cerberus. If the gamers comprehend the background myth of the hound as a hell gate keeper, they would focus on casting ice magic. Doing so, gamers will be rewarded with a weapon going by the same name of Hades' hound. Another example is from Square Enix's *Final Fantasy IX* (see Table 4).

Table 4

Conditional Clue in Final Fantasy IX

Quest Objective	Clues				User Function
	Verbal	Visual	Audial	Operative	
Defeating a	The name	Tree	Intimidating	Soulcage's	Configurative

tree monster called Soulcage	'Soulcage'	with a skull	undead or zombie summoning ability Soulcage's instant death ability

As seen from Table 4, the clues revolve around "death". From the onomastic verbal clue, "soulcage" suggests the necessity to "uncage" the soul, death. The visual clues strengthen the "death" through the depiction of a skull. The intimidating audial element further supports the "death" nuance. Operative elements even further deliver the "death" nuance through "undead summoning" and "instant death" abilities. Comprehending this "death", players are expected to counter "death" with its opposing force, life. Thus, the decision the players should take is to cast life related spells like "cure" or using life related items like "elixir" or directly use a spell by the name "life".

This if-then operation requires the players to perform a configuration through various in-game accesses like changing spells, changing weapons, and many other mechanical changes. Therefore, conditional clues are likely to intratextually link themselves to onomastic elements of the games. These elements could be found in characters, spells, abilities, weapons, armours, places, and any other in-game objects.

Collocative

Collocative clues operate under the premise of "with a comes b", which emphasises a pairing presence. This type of presence indicates that the clues tend to minimise the options of correct answers. The following example from Monolith's *Middle-Earth: Shadow of War* might help to comprehend collocative clues:

Table 5

Collocative Clues in Middle-Earth: Shadow of War

Puzzle	Choices
In the land of Mordor where the _____ lie We bear our banners aloft, boots like _____ Our _____ quick, our countenance dire. For who in this dark, dream-hunted ___ dares Resist the righteous flame of _____ And ____ themselves to despair and	Shadows/Doom/Cadence/Wrath/Drums/Land

death?

As seen from Table 5, the correct answers are limited under the premise "with A comes B" projected through grammatical aspects, causal consequences, and thematic alignment. The example for the first is seen from *In the land of Mordor, where the "shadows" lie*, the second from *We bear our banners aloft, boots* (stomps that sound) *like "drums"*, and the third from the war theme as seen from *Resist the righteous flame of "wrath"*.

As indicated from Table 6, the theme is the primary focus of the puzzle, followed by grammar and causality. It indicates that the puzzle attempts to immerse the players to the narrative of the game. The fact that the game is an extended lore of Tolkien's world has hinted to the players that the theme of the game will not deviate from the theme of war among races. Capturing this theme will both assist the players in solving the puzzles and immerse them in the lore. However, since the user function of collocative puzzles is likely to be interpretive, they would be designed with the players' general knowledge in mind, meaning that they can solve the puzzles through logical pairing such as general grammatical and writing system.

Table 6

With A Comes B Breakdown

Puzzle	with A comes B			User Function
	Grammar	Causality	Theme	
In the land of Mordor where the _____ lie	√	×	×	Interpretive
We bear our banners aloft, boots like _____	×	√	×	
Our _____ quick, our countenance dire.	×	×	√	
For who in this dark, dream-hunted ___ dares	√	×	×	
Resist the righteous flame of _____	×	×	√	
And ____ themselves to despair and death?	×	×	√	

Figure 2 shows how Qwilfish evolves into Overqwil in Pokémon Arceus.

Collocative clues are likely to occur in the form of wordplays. In Game Freak's *Pokémon Arceus*, for example, where the strategy of evolving monsters into their stronger forms is a must, gamers have to pay attention to particular conditions in order to make the evolution happen. One of the monsters that the gamers need to evolve is a puffer fish, such as Qwilfish in the Pokémon game. "Qwil" is a wordplay of "quill" that might refer to "feather" or "sharp spines". The meaning of "quill" is linked to the image of the fish Pokémon whose body is covered with sharp spines. The "feather" meaning of "quill" acts as an obstacle while the "sharp spines" functions as a hint. The first meaning is a distractor for the correct associative meaning which is the second one. This meaning has an association with 'barbed'

that associatively signifies spikes. “Barrage” and “twenty” are visually associated with the numerous spikes protruded from the body. If these two associative meaning, “sharp spines” and “number of spikes” are connected, the gamers would be able to decode how to evolve Qwilfish.

Figure 2

Qwilfish Evolves Into Overqwil in Pokémon Arceus

Referential

Referential clues operate under the premise of “a refers to b”. As the name and the premises suggest, the clues focus on employing references. Thus, the puzzles might be easily solved when the players fathom what the puzzles refer to. The references most of the time point to in-game objects in the games played. The example in Table 7 on Square Enix’s *Final Fantasy VIII*’s painting puzzle might better illustrate how the clues work.

Table 7

Referential Clues in Final Fantasy VIII

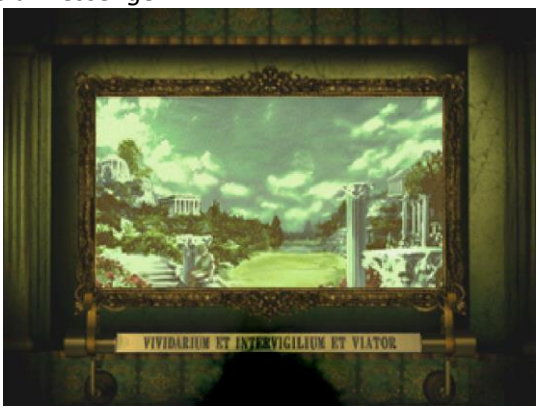
Puzzle	Referenced Clues	Explored Clues	User Function
Guessing the title of a painting	A clock with clock hands pointing on VIII, IV, and VI	IGNUS (fire) INANDANTIA (flood) IUDICIUM (judgement) INTERVIGILIUM (sleep) VENUS (love) VIATOR (messenger) VIGIL (watchman) VIVIDARIUM (garden) INAUDAX (cowardice) XYSTUS (tree-lined road)	Explorative Interpretive

	XERAMPELINAE (red clothes) XIPHIAS (swordfish)

The puzzle asks the players about the title of a mysterious painting. The players have to traverse the gallery where the untitled painting is housed (see Figure 3). They will encounter twelve paintings with titles. The players have to examine the paintings to reveal the titles and from the twelve titles, the players have to pair the correct names to generate the title of the untitled painting. If the players heed his or her surrounding in the exploration, they will spot a clock whose hour, minute and second hands pointing at VIII, IV, and VI respectively. This is the referenced clue to solving the painting puzzle. Based on the clock hands, the players have to select Latin words containing VIII, IV, and VI and those refer to the order of the painting titles namely VIVIDARIUM, INTERVIGILIUM, and VIATOR.

Figure 3

In the Garden Sleeps a Messenger



Referential clues also operate configuratively, which means the players need to do some in-game adjustments to solve the puzzles. When configurative user function is implemented, explorative and interpretive user functions would integrally function along with the configurative user function.

Indicative

Indicative clues operate under the premise of ‘a is a until it becomes b’. In indicative clues, implicit mechanical instructions to configuratively perform in-game action sequences are given to the players. If the players succeed in digesting the implicit clues, they would be able to solve the puzzles. The challenge these clues offer come from the mechanical instructions implicitly delivered through narrative or verbal expressions. Table 8 gives an example from Konami’s *Metal Gear Solid* might help shed light on how these clues operate (see Figure 4).

Table 8
Indicative Clues in Metal Gear Solid

Clues (the Player's Past Actions)	Clues (the Player's Memory Card)	User Functions
Now let me read your mind. No perhaps I should say your past. You are extremely careful of traps. You are either very cautious or you are a coward	Still don't believe me? Now I will read deeply into your soul. Ah. I can see into your mind. So you like (Suikoden/Azure Dreams/other Konami games) You like Castlevania, don't you? I see that you enjoy Konami games.	Interpretive Configurative

Figure 4
Psycho Mantis Could Read the Saved Game File on The Memory Card

The character who utters the lines is a psychokinesis and telepathy practitioner called Psycho Mantis. The players cannot defeat him with a normal method like shooting or punching as he could read every move that Snake performs. This is hinted from the clues as seen on Table 8. The first clue deals with the fact that Psycho Mantis is designed with the ability to track the player's actions in the game. Thus, he could know whether the players play the game aggressively or tactically from which the lines of clues appear. After analysing how the players play the game, he goes further in checking what games are saved in the memory card plugged into the Playstation system. If games from Konami are within the card, he would utter the titles. These clues indicate that the players have to do something with the game mechanics or the system to win the battle.

Reflective

Reflective clues operate on the basis of "a can be changed with b". These clues combine explicit and implicit hints to suggest the players that either refer to a

denotative or a connotative clue. Comprehending the denotative out of the connotative or vice versa will compel the players to exercise explorative and configurative user functions e.g. traversing the game world and changing equipment. Table 9 shows an example from Square Enix's *Dragon Quest XI* shows how reflective clues work.

Table 9
Reflective Clues in Dragon Quest XI

Quest Name	Objective	Clues	Connotative	Denotative	Answers	User Functions
A Right Riddle	Equipping the right weapons	What sort of single-handed sword sounds like you pilfer it?	Pilfer	Single-handed sword	Steel Broad-sword (steel sounds like steal which is synonym for pilfer)	Explorative
		This one's like a short-tempered cactiball – it's particularly prickly! What sort of weapon sounds like it's made to frustrate something that's flagging?	Flagging Frustrate	Cactiball	Fizzle Foil (fizzle is correspo-ndding with flagging and frustrate with foil)	

As seen from Table 9, spotting expressions which fall into connotative and denotative ones will lead players to comprehend the puzzle. In the first puzzle, the denotative clue is a single-handed sword. To perceive the sword as denotative comes from the fact that the puzzle instructs the players to find weapons and equip them. Since there are numerous single-handed sword types, the players are required to decipher what sword it is by directing their attention to the remaining expressions. The only expression that stands out in the sentence is pilfer. The players have to decipher them by addressing them in the fashion of implied meaning as suggested from 'sounds like'. Thus, the correct answer is "pilfer" since "steel" in steel broadsword sounds like steal. Similar process of deciphering clues occurs in the second puzzle with a difference being where to find the weapon. This is hinted by the mention of "cactiball", a cactus like monster nesting in a desert area.

Recognising this, the players have to traverse the desert area in the game to locate the weapon.

Reversal

Reversal clues operate under the premise of "a comes after b", meaning that causality is reversed through implication or inference. These clues would prompt the players to think in a reversal logic–effect-cause relationship.

Konami's *Suikoden* series are famous for runes–Nordic alphabets–attached to characters, where the characters attached with the runes could cast spells, enhance their skills, or equip themselves with unique abilities. One of those runes is called Waking Rune. Characters attached with this rune will fall asleep when the battle starts. They need to be damaged by enemy's strikes to wake them up. Woken up, they will go into the stats of berserk, which increase the attack stats of the characters. The reversal comes from the fact that "waking" implies the presence of preceding action, sleeping. That the series have a rune called Sleep from which sleeping effect can be evoked signifies the reversal logic Waking Rune implies. The fact that the characters of Sid, Juan, and Ornan have a sleepy look also suggests a causal assumption that they carry a Waking Rune to prevent them from sleeping, which is a desynchronised fact when the battles take place.

Reversal logic also employs general logical reasoning in the world which shows desynchronicity within the gaming or narrative reasoning. The following example from Atlus' *Thousand Arms* illustrates the statement:

Palma : Can you make a grass whistle, Meiss?
Meis : a. Of course! Check it out!
b. Nah, that's for kids!
Palma : (response to choice a) Eww! You put grass in your mouth! Don't you think it's unsanitary?
(response to choice b) I'm glad to hear that. Nobody in their right mind would do something unsanitary.

The game features a dating simulation where players, through the hero character Meiss, could date several girls in the game, each with distinct personality traits. Players must understand these traits while simultaneously being nice and romantic to increase intimacy levels. Choice "a" suggests a romantic response, making it more likely to attract players. In contrast, choice "b" evokes arrogance and a less romantic tone, making it less appealing. However, if players grasp that intimacy must be built based on the girl's personality, they may choose the less romantic option of choice "b". Selecting this option leads to a positive response from Palma, as it demonstrates that Meiss values cleanliness, aligning with her personality. The game's logic for romancing a girl is generally reversed.

Signaling

The premise of signalling is "a signals b what to do". Signalling is related to cueing, where timing plays the most significant role in deciding the correct response. These puzzles are mostly found in games with Quick Time Event (QTE), where quick thinking is required to execute the most correct response. One of the examples of QTEs can be found from Konami's *Suikoden* series' one-on-one duel. To win the duel, the players have to guess the opponent's upcoming moves by deciphering verbal signals expressed by the opponents (see Figure 5). Table 10 gives an example from Konami's *Suikoden V* might help shed light on how these clues operate.

Table 10

Signaling Clues in Suikoden V

Clues	Intended Action	Correct Response	User Function
Let me see what you can do.	Guard	Attack	Interpretive
You should have shown me a move at least as powerful as this!	Special Move	Guard	
Let us calm things down a bit.	Guard	Attack	
Heh heh heh... A little bit of tension isn't a bad thing, either.	Guard	Attack	
Very nice... Now I'll show you what I can do!	Super Move	Guard	
I'm not finished with you yet!	Attack	Special Move	
This time why don't you make a move?	Guard	Attack	
Very nice... But do you think you can counter this next one as well?!	Special Move	Guard	

Figure 5

Rock Scissors Paper System in Suikoden V

The duel in the series operates under *rock scissors paper* (RPS) system where attack > guard > special/super move > attack. The players are given three seconds to decide which move they will take in response to the battle cries expressed by the opponent. Table 10 shows the dialogue during a duel between Gizel Godwin, one of the antagonists, against Prince Freyjadour Falenas, the hero of the game. The players can either perform a trial and error by mnemonically memorising the pattern or guessing the next move through a quick scan on the lines and the voices uttering the lines.

Timing in signalling also refers to the narrative timing in which certain cutscenes that display particular narratives appear. Tri Ace's *Valkyrie Profile*, for instance, employs this when the players have to recruit supporting characters called Einherjar – they can be recruited based on the chapters of the narratives. Another example is Square Enix's *Final Fantasy X-2*. If gamers want to acquire a "dressphere" – a power-imbued costume or trainer, they have to patiently walk through chapter one and two and meet the lion-like bipedal Ronso Kimahri.

Kimahri: Ronso youth grown horns of hatred for Guado.
Yuna: a. Have you discussed it with everyone?
b. You have to learn to deal with these things!
c. Why not forget about it for now?

If gamers are accustomed to the game's prequel, *Final Fantasy X*, they would select the second choice which is the correct choice. The two games narratively deliver the message of being self-reliant as depicted from the main character Yuna. The self-reliance message is more profoundly expressed in the sequel as seen from the personality development of a more matured Yuna. In the second chapter, when asked a similar question, gamers have to select the second choice, which contains the similar message, in order to once more unlock the trainer "dressphere".

Discussion

To be playful, as hinted by Huizinga (2014), an act should indicate lability and merriness – the breaking of rules to break a laughter within the context of a contest. Ludic language serves these indicators. As laid out by Crystal (1998) through examples, the lability of language use, such as puns, aims at triggering laughter from those reading the puns. The problem is that in-game puzzles might not entirely work the same way as how puns work for the sake of lability and merriness. Puns indicate their lability through word plays while puzzles do that via the various ways they are displayed and clued. In-game puzzles also address this lability either through lingual, para-lingual, and non-lingual expressions. This is evident from the various means of exploiting them in tandem with visual, audial, and operative elements.

Playability, as implied by Aarseth (1997), is manifested through user functions. Interpretive user function suggests that in-game puzzles are designed with a clue to which the players have to do an interpretation. All clue types are fundamentally interpretive since the players have to cognitively decipher what the clues mean. This is particularly so with clues that employ orbital and signalling user

function. The next user function, explorative, focuses on narrative and mechanical exploration exercised to solve the puzzles. Clues with this user function encompasses mostly puzzles aimed at driving the players to traverse the game world, especially RPGs with an open world genre. Collocative, referential, and reflective clues are likely to be designed with this user function since they would mostly exploit in-game objects as possible hints. All these user functions define the eight clues and determine the playability of the clues.

The combination of ludic language and user function could serve as a theoretical basis to investigate how puzzles are designed in the video game context. Without the combination of the two, puzzles who rely not only on lingual aspects, but also visual and mechanical aspects would only be treated textually, implying an ignorance toward the narrative and mechanical aspects of the games. This combination could patch the gaps left by the previous theories that explicate puzzles, riddles, and hints. Enigmatisation, the process of encoding hints (Hassan-Rokem & Shulman, 1996), could be explained in detail when the process is applied in the video game context. The enigmatisation in games requires ludic language and user functions to explain how the narrative and mechanical elements of the games ought to be aligned and adjusted. Through this alignment and adjustment, what Pagis (1996) calls as balance in the riddles could be achieved.

The combination of ludic language and user functions could also add a contribution to the study of puzzling language, as studied by Danesi (2002). Orbital, conditional, collocative, referential, indicative, reflective, reversal, and signalling clues could signify how puzzling language function and operate differently in the gaming context. This typology could be further employed and transformed into an algorithm to invent a puzzle design related tools as studied by Nelson and Stratchan (2009), Oei and Patterson (2014), and Pusey et al. (2021). The logical basis of typology renders it possible to be transformed into becoming an algorithm.

Conclusion

The aim of this qualitative study is to address the issues of puzzle design in video games from the perspectives of ludic language. To achieve the aim, a typology of puzzle design in video games that emphasises on the tandem between ludic language and user functions was constructed. The findings indicate that puzzles in game are constructed based on eight premises. We call these premises orbital (a is there for b), conditional (if a, then b), collocative (with a comes b), referential (a refers to b), indicative (a is a until it becomes b), reflective (a can be changed with b), reversal (a comes after b), and signalling (a signals b what to do). The findings further indicate that ludic language and user functions work side by side in delivering the premises from which the clues are constructed. The combination further suggests that ludic language in game design is likely to function mechanically in a blend with the game narratives. Nevertheless, the study was limited to ludic language and user functions in general. Therefore, future studies on puzzle designs in video games can still disclose possibilities on specific parts of ludic language like wordplay, or of specific genre of games like RPGs, and of specific user functions. Future studies could propose, define, and formulate the neologism of *puzzlinguistics*

by implementing quest theory by Howard (2022), balance theory by Csikszentmihalyi (2014), gaming language theory by Purnomo and Khristianto (2019), the study of distraction by McMahon et al. (2011), dramatic sense of puzzles in video games by Fullerton (2008), puzzle design principles by Schell (2008), and pedagogical and affective dimensions by Anable (2018). Delving into studies of game language via the use of these theories could shed more light on the linguistic intricacies involved in the design of video games.

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