

Cues and insinuations: Indicating affordances of non-player character using visual indicators

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ABSTRACT

Non-player characters (NPCs) provide an important service in video games in that they provide an active connection to the narrative through their behavior, as if they were actors in a play. In this study, we aim to explore in what ways the visual appearance of an NPC affects how players perceive their role in the game, and what criteria players use to evaluate the role of NPCs based on visual information. This is done by performing a survey of players, where the respondents are asked to determine the role that a number of NPCs had given their visual appearance, and describe how they decided the roles of the NPCs.

Keywords

Non-player characters, affordances, visual indicators.

INTRODUCTION

Non-player characters (NPCs) provide many functions in video games (Bartle, 2004). They supply the players with information and hints about the story of the game, hand out quests, provide them with challenges, and act as extras in the game world. These functions all link into the ongoing narrative of the game, where each NPC affects the players' feeling of immersion through their actions. In order for this effect to be a net positive, the NPCs must act in accordance with the expectations of the players (Desurvire et al, 2004; Loyall, 1997). These expectations arise from the preconceived notions that players have of the NPCs based on how they are presented (Loyall, 1997). Therefore, it is of the utmost importance that NPCs are designed in such a way that they look, feel, sound, and behave in accordance with what is signaled to the player. The goal of this study is to discover the ways in which players decide what actions an NPC affords based on its appearance, and by what criteria that decision is made. This was done by performing an online survey where respondents have been asked to categorize NPCs as having certain functions, as well as a description of their reasoning. In the end, we identified a number of categories that players use to identify which functions NPCs provide in games.

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BACKGROUND

NPC play a major role in upholding the believability of computer games, and through their behavior they can both strengthen and lessen the players' feelings of immersion (Johansson, 2013). This behavior, however, has to be in line with the ways in which the players expect the NPCs to act (Desurvire et al, 2004; Loyall, 1997), and with the roles the player has understood the NPCs to have in relation to the narrative (Loyall, 1997).

Interaction and narratives

According to Jenkins (2004), the narrative of a game is not told solely through cut scenes but also through in-game events and actions taken by other characters in the game. Jenkins calls these occurrences embedded and emergent narrative. Embedded narratives are narratives that are built into the gaming experience – for example a town crier providing exposition within the game. Emergent narratives are narratives that arise as the player plays the game, for example from how an NPC in the game behaves over time.

Calleja (2009) argues that the notion of the narrative as an all-encompassing concept with proverbial tentacles sneaking into every nook and cranny of the play experience makes the narrative useless as an analytical tool since it encompasses the entirety of the play experience. Instead, he proposes that there is a need to differentiate between what he calls the scripted narrative (the structures and narrative content built into the game by the game designers) and the alterbiography (the narrative that emerges as the game is played). In essence, Calleja states that the story that the players build up around themselves as they play is a record of their exploits and adventures in the game, rather than a construct of a the exploits of others. Although the players' embodiment can vary between different game types, the alterbiographic process is fundamentally the same. This means that the concept of an emergent narrative may be unnecessarily unspecific.

By playing the game, the players write their own alterbiography. In the process of doing this, they are also exposed to concepts that help them make sense of the world which they now inhabit. As the players learn the rules, themes, and truths of the game world, they start to amass a number of tropes about how the game world. Some of these tropes will be visual, and through them the game can present certain concepts. By using these tropes in the game world, game designers can create a certain level of environmental storytelling. This would largely fall into what Calleja calls the scripted narrative or what Jenkins calls the embedded narrative. Fernández-Vara (2011) describes the use of small indicators that cue the player into what story the environment is telling by tying into tropes presented by the game. By using visual indicators in the world, we can introduce certain notions on a more subtle level – for example the architecture of buildings, environmental effects such as fog or lighting, and the items worn by an NPC. Each of these notions will influence how the players create their alterbiography.

Affordances

By presenting NPCs in different ways, we cause players to expect interaction with NPCs to perform certain functions, or what Gibson (1977) calls *affordances*. However, in order for the player to utilize these affordances, they must, as in any software construct, first be able to perceive them (McGrenere & Ho, 2000). How these affordances are designed and presented can affect what the challenges of the game are, which ties firmly into Fernández-Vara's indicators. The challenge for the players lies in being able to perceive and process the indicators used by the game in order to perform the correct interaction sequence (Linderoth, 2013). However, in order for the players to correctly perceive and process these indicators, they must have understood in what ways the game uses them to

signal certain concepts. Furthermore, in order for collections of indicators to seem believable and not damage immersion, they must be carefully designed to be in line with the overall narrative presented by the game. This must also extend to the NPCs that inhabit the game world, and that provide different functions and services within the game (Bartle, 2005).

Types of NPCs

In *Designing Virtual Worlds*, Bartle (2004) describes a number of roles for NPCs, where each role provides a certain function within the game. These roles are:

- Buy, sell and make stuff
- Provide services
- Guard places
- Get killed for loot
- Dispense quests (or clues of other NPCs' quests)
- Supply background information (history, lore, cultural attitudes)
- Do stuff for players
- Make the place look busy

Each of these roles carries with it certain requirements on functionality on the parts of the NPCs. Players also expect certain behaviors from NPCs based on these types. For example, an NPC found to be guarding something may be expected to react in a hostile manner to intruders. Failing to sufficiently inform the player of this type of behavior could lead to the players' autobiographies not matching the intended narrative of the game, thus creating a false affordance – which in turn damages the player's sense of immersion.

METHOD

The data for this study was collected using an online survey. In this survey we displayed in-game images of a number of NPCs, and asked the respondents to classify these NPCs per type, and to describe the visual indicators that influenced their decision.

Included games

We selected 4 games for this study, all released in 2014 (in one case an expansion pack). The games were chosen based on that they are all games are played from a third person perspective, and allow the player to interact with NPCs on a one-to-one basis. The games included in this study can be seen in Table 1.

NPC selection

A total of 27 NPCs were selected from the games listed above, based on the roles laid out by Bartle (2004). The NPCs were selected so that they would represent diverse roles as portrayed in different games.

Game	Developer/Publisher	Genre
Assassin's Creed: Unity	Ubisoft Montreal / Ubisoft	Sandbox action adventure
inFamous: Second Son	Sucker Punch Studios / Sony Computer Entertainment	Action adventure game
WATCH_DOGS	Ubisoft Montreal / Ubisoft	Sandbox action adventure
World of Warcraft: Warlords of Draenor	Blizzard Entertainment	Massively multiplayer online role playing game

Table 1: Games included in the study

We attempted to avoid easily identifiable NPCs, such as characters prominently figuring in the story of the game. In essence, we tried to avoid the case where respondents would recognize characters and without consideration decide that they fulfill a certain role. Instead, we focused on more common NPCs.

Survey design

The survey consisted of two parts. The first part consisted of questions related to basic demographic data regarding the respondents. This included age, gender, nationality, and frequency of consumption of stories from the fantasy, science fiction and historical fictions genres, as well as how often they watch TV-series and film, and how often they read books and comics. The values tracking experience and media habits were standard 6 degree Likert scales, where the scale was “Never”, “Very Rarely”, “Rarely”, “Occasionally”, “Frequently” and “Very Frequently”.

Part two was the actual survey, where the respondents were asked to classify a pictured NPC as one of the types described by Bartle (2004), or suggest a type that they think better described the NPC. The respondents were also asked to motivate their decision. Lastly, the respondents were asked if they were previously familiar with the NPC(s) in the picture.

An example of a picture can be seen in Figure 1. We tried to avoid including UI elements in the graphics for this study, and edited out many that would immediately identify an NPC as being of a certain role, for example an icon representing a button the game controller with an accompanying text saying “SHOP”. Images were accompanied by a text clarifying which NPC in the picture we were asking the players to evaluate. These were formulated along the lines of “What is the role of X in the picture?” The question for the example seen in Figure 1 was “What is the role of the man to the left in the picture?”



Figure 1: An example picture from the study. Image taken from Assassin's Creed: Unity

Respondent selection and response pruning

Respondents were self-selected, and were exposed to the survey through various social media, notably Reddit and Facebook. Incomplete responses, as well as those made by respondents below the age of 18, were considered invalid and thus discarded before the analysis process began.

Data analysis

The data analysis was essentially split into two parts. Simple frequency analysis was used to determine the most common answers to the classification task. This gave us a percentage split between what type the respondents considered each NPC to be.

The descriptive part was analyzed using thematic analysis, where the initial step was focused on eliciting which categories of identifiers respondents used to determine an NPC's role. These categories were later used to elicit specific identifiers used by the respondents.

RESULTS AND ANALYSIS

A total of 294 responses were recorded for the survey. Out of these 81 were discarded due to being incomplete or underage. Out of the 294 responses, 213 were used in the study.

Respondent demographics

The 213 respondents providing valid responses ranged in age from 18-52, and the average age was 26.3 ± 6.5 with a median of 21.5. Respondents primarily came from Sweden (29%) and the United States (25%), along with smaller numbers from other western nations. One respondent did not specify their nationality. Out of the valid responses, 76%

were male, 21% were female, 1.5% identified as other and 1.5% declined to specify their gender.

Respondents overall consumed media from with all genres and media forms occasionally, frequently, or very frequently. Only historical fiction and comic books were less common among the respondents. Historical fiction was consumed rarely or occasionally, whereas comic books were consumed rarely to very rarely, with a significant minority never consuming comic books.

Elicited factors

This discussion will be broken down by Bartle type, where the identifying factors gathered from each type NPC will be described.

The overarching factors used by players identified by this work are:

- Surrounding area and location of NPC
- Actions taken by NPC in picture
- NPC attributes and visual presentation

The respondents identified NPCs based on how well these factors relate to preconceived notions of how a certain roles should be portrayed – for example a shopkeeper should be next to wares or behind a counter, and a guard is supposed to be armed and wear some kind of uniform.

Buy, sell and make stuff

As previously mentioned, shopkeepers and similar tradespeople are identified primarily based on their proximity to a counter, wares, sign that identifies the sale of goods, or other things one might find in a shop. This was reinforced if the shop owners seemed to have the player's attention, or were trying to get it – for example by shouting out their wares.

The respondents identified the type of wares sold by the NPC primarily based on the context in which the NPC was found, and the equipment of the NPC. For example, an NPC standing behind a counter in a brightly lit pharmacy, wearing a white lab coat was perceived as a pharmacist, whereas an NPC in a trench coat, sun glasses, and baseball cap standing in an alley was perceived as a drug dealer. Similarly, NPCs standing next to counters where beverages or alcohol were sold were often assumed to be barkeeps.

In some instances, respondents were unsure if the NPCs were vendors or quest givers.

Provide services

The respondents generally used the same criteria to identify NPCs who provide services as the do for NPCs who buy, sell and make stuff. In fact, there appears to be some confusion among the respondents as to what distinguishes the two types of NPC. In many cases, respondents seemed to interpret the lack of goods as the NPCs providing services rather than goods or wares. In addition to the aforementioned confusion, respondents also confused NPC that provide services with quest givers.

Guard places

The respondents identified NPCs as guards based on their proximity to things that may be sensitive – such as valuable goods, restricted areas, or seemingly high-ranking people. The guards themselves were identified by behaving in a distrustful way to people not of their faction. Many respondents identified guards based on the fact that they are armed and/or armored, and often portrayed as muscular or otherwise martially capable. Respondents identified guards as having fairly generic or non-unique appearances, often as wearing masks (thus rendering the guards literally faceless).

Get killed for loot

Similarly to NPCs intended to be guarding places, respondents often identified NPCs intended to get killed for loot as being generic and non-unique. Many respondents considered the not showing a face on the character (thereby rendering them faceless) to be a strong indicator that this was an NPC intended to be killed for loot. In many cases, respondents identified that a threatening stance in an NPC implied that they would be there for the player to kill. Lastly, respondents stated that clusters of similar, generic, NPCs are an indication that the NPCs may be there to be killed for loot.

Dispense quests (or clues of other NPCs' quests)

The respondents identified that quest givers are almost always placed in a way that makes them easy for the player to find, and that they have visual attributes that make them stand out from other NPCs. These visual attributes fall largely into two categories: one where the NPCs seem distressed and need help from the player, and one where the NPC is a powerful character who orders the player to do certain tasks. In the case of the distressed NPC, they appear non-threatening and actively trying to get the player's attention. In the case of the commanding NPC, they appear to be powerful and in charge, often surrounded with items related to being in control of a complex situation – for example maps or intelligence reports. In both categories, the NPCs are portrayed in a unique way, and often show their face to the player – making them an individual rather than a faceless enemy. The respondents expect quest givers to stay in one location and to be passive, so that the player can find them.

Supply background information (history, lore, cultural attitudes)

NPCs that supply background information were primarily identified by the respondents as doing so in both an active and a passive manner. The active NPCs were broadcasting information into the world, much like a town crier would. The passive NPCs provided information just by being there – for example patrons in period costume lounging around at a tavern. This latter type are very similar to what Bartle would classify as NPCs who make the place look busy, and there seems to be some confusion among the respondents as to which NPCs belong to which category.

Do stuff for the players

This type of NPC was poorly understood by the respondents, and the NPCs were often described as being simply allies. If the NPCs were armed, respondents would classify them as allies if they had a non-threatening stance, or didn't show aggression, towards the player. Respondents seemed to identify armed NPCs as being allies for combat, whereas unarmed NPCs were more often considered as portraying services – for example skill trainers.

Make the place look busy

The respondents often identified these NPCs by what they aren't, rather than what they are. NPCs of this type are generic in appearance, placed in locations that do not capture the player's attention, and who are dressed in fairly unremarkable ways. The respondents often considered them not mattering and being obvious filler content. If the player can interact with these NPCs, the respondents expect them to get generic responses.

Types suggested by the respondents

Overall, the respondents overwhelmingly chose the Bartle types rather than suggesting their own types. One frequently occurring type suggested by players was a type that is simply there to be killed, while not giving the player any rewards for the kill ("dropping loot", in gaming lingo). The evaluation criteria were similar to those of the Bartle type "Get killed for loot", where generic appearances (often with masked faces) and being armed are common evaluators.

Demographic differences

In order to gather primary indications regarding differences between different demographic groups, we also performed two additional analyses. The first compared responses from respondents from Sweden and the United States (the two largest countries). The second compared the responses from respondents who were male and female. These categories were not cross-correlated, i.e. comparing females from the US to males from Sweden.

Swedish and US responses

Responses from Swedish and US respondents were generally similar, although there are small differences in how the respondents described their reasoning process. Swedish respondents often described the actions taken by the NPCs, whereas US respondents often discussed NPCs in terms of stance and posture. Both groups frequently mentioned weapons, where the US respondents would mention the existence of weapons in a matter of fact way, basically acknowledging their existence, whereas Swedish respondents would mention weapons as threats.

It should, however, be mentioned while the US respondents were using their native language, Swedish respondents were responding in a second language. This could have impacted how the respondents chose to, or were capable of, describing their reasoning.

Male and female responses

Responses from male and female respondents were also generally similar. There were very few differences in how the two groups of respondents evaluated NPCs based on visual indicators. In general males seemed to be slightly more prone to focus on the area surrounding the NPCs, whereas females seemingly focused on the attributes of NPCs themselves. These findings, however, are very weakly supported. This may stem from a weakness in the use of thematic analysis, and there may be a need to examine the differences in responses using a different method.

Other findings

In many cases, the respondents' preconceived notions seem to have been learned from previous game experiences. In their responses, the respondents commented on that some NPCs looked generic or non-unique, and were therefore probably unimportant to the main story and mostly there to act as filler content – for example getting killed for loot,

guarding places or making the place look busy. Conversely, NPCs that were perceived as unique or visually distinct were often considered to be important to the narrative. In some cases, a certain level of visual fidelity rising from better graphics was enough to trigger this response, with respondents commenting that a character with a high level of detail must be important.

The respondents were very quick to pick up on user interface (UI) elements left in the images. They often used UI elements to determine NPC types, which means that these types are not only signaled by attributes of the NPCs themselves, but also with UI elements such as texts, auras, map indicators, or cursors. This was particularly noticeable in the responses to the image shown in Figure 2. Even if there are indicators as to the function of the NPC, they may be overridden by the function indicated by the UI. Similarly, some respondents dismissed NPCs as not belonging to certain types (notably the “Dispense quests” type) due to the fact that they did not have the usual UI elements associated with the type. It should be noted that players never stated that they suspected that UI elements had been edited out of the images. As a result, UI elements could fundamentally change how a player identifies NPC types and thereby affordances and it is a limitation of this study that we did not take UI elements into account as a point of data collection. Overall, the respondents identified the functions and types of NPCs in remarkably similar ways. Although NPCs were never unanimously classified as being of a certain type, they were in all cases classified as very similar types, and those very same types were often perceived as having the same attributes. For example, an NPC intended to buy and sell things was generally not confused with one that is there to be killed for loot.

DISCUSSION AND CONCLUSIONS

In many cases, the respondents were very clear on what factors they used to evaluate NPC roles, particularly focusing on things that mapped well to equivalents from real life



Figure 2: A scene from WATCH_DOGS. Respondents sometimes identified the man as an opponent based on the red dot on the mini map.

or other media, for example NPCs having a hostile stance, being armed or wearing masks. The relative level of agreement among the respondents may indicate that the roles put forth by Bartle (2004) may either be slightly overlapping, or difficult for players to differentiate. This is also supported by the responses recorded, where respondents outright say that they had difficulty determining which role the NPC has. In examining the responses, it is also encouraging to see that players do identify the small indicators described by Fernández-Vara to discern what role an NPC has and what the in-game scene is attempting to portray. This shows that Fernández-Vara's indicators may be a very valuable analysis tool for NPC believability, especially when coupled with Calleja's alterbiography concept.

Effects of respondent demographics

The respondents responding to this were overwhelmingly western. This likely stems from several factors, most prominently that the survey was distributed via social media channels primarily popular in Western Europe and the United States. Furthermore, the choice of English as the language for the survey likely further skewed the respondent group towards countries where English either a native language or widely spoken.

Furthermore, the majority (76%) of the respondents identified as male. This will likely skew the interpretation of the NPCs' roles towards a more male perspective. Gamers who identify as female (21%) are likely underrepresented in this study in comparison to the ratio of the gamer population in general (Winn and Heeter, 2009). This underrepresentation may have arisen from the distribution methods used for the survey, and it may have failed to reach a large number of female gamers. If this is the case it is very unfortunate. As for the respondents identifying as other genders, the group of respondents is too small (1.5%) to draw any conclusions. Similarly, the 1.5% of respondents who declined to specify their gender is unlikely to impact the result in any meaningful way.

Future research

As previously stated, the roles presented by Bartle were seemingly perceived as hard to differentiate. Furthermore, Bartle's work is derived from Multi User Dungeons (MUDs) and the transferability to other genres may be limited. Although the types map fairly well to Massively Multiplayer Online Roleplaying Games (MMORPGs) such as World of Warcraft, there are some shortcomings for other genres – for example the that not all NPCs who are there to be killed provide loot. Furthermore, the transferability to genres even further away from MUDs is likely very low. Because of these factors, a successor to Bartle's functional roles may be required to be able to fully describe the place NPCs have in video games.

Although this study has presented some insight into in what ways players perceive NPC appearances and processes them as functional roles, this study is limited in that it only provides visual information to the respondents. Sounds, animations, and similar aspects can also carry information about roles, and this is something that should be explored further. Lastly, the aforementioned effect of UI elements should be explored further, possibly through paths where the UI elements conflict with what is being indicated by the representation of the NPC, be it graphics, audio, or behavior. It is likely that we will find similar indicators for these other aspects as we have for the visual aspect.

It should also be mentioned that although we only found weak indicators of differences in how different groups of respondents reasoned about NPC roles, it is very possible that

different demographics will perceive NPCs in different ways. The demographic groups used in this study are all western and should feasibly respond similarly to similar stimuli. There may be a need to approach this material using a different method in order to elicit findings that may be difficult to find using the thematic analysis methodology found in this article. A quantitative textual analysis may shed light on less obvious properties of the responses of the respective demographics. Ideally, these studies should be careful in their selection so that the distribution between respondent genders is more balanced.

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