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Abstract. Digital games struggle to blend compelling narrative with interactivity. For example, computer role-playing games (CRPGs) allow players the freedom to explore an open world, yet limit their interaction with the world's inhabitants to selecting from pre-determined dialogue choices. In this paper, we explore how players behave when truly free-form dialogue with non-player characters (NPCs) is supported. In the novel *Persiflage* game, players converse with NPCs using speech. NPCs are in turn voiced by a human, allowing truly free-form conversation. Through a study of five groups playing the game, we show how players converse, interact, and play using natural language.

Keywords: Game design · natural language in games

1 Introduction

In computer role-playing games (CRPGs), players enter a virtual world in which they can take on different personas and engage in novel experiences. Players can adopt roles as diverse as a renaissance assassin [23], a dragon-slaying adventurer [4], or the commander of a spaceship [5]. Games enable fantasies, allowing players to immerse themselves in new worlds and situations. A large part of these fantasies is the stories that games embody.

In CRPGs, however, players lack the ability to carry out open-ended conversations with the inhabitants of the game world [17]. This restricts the player's ability to use dialogue to learn about the world or to pursue interests beyond those anticipated by the game's designers. Digital games restrict players' interaction with characters they encounter in the world, allowing only what Lessard terms "dialogue trees of pre-defined utterances" [14]. Players are presented with a series of dialogue choices from which they must choose, limiting their ability to truly guide a conversation.

In this paper, we explore the effect of *permitting truly open-ended conversation with non-player characters in computer RPGs*. Since current AI techniques do not allow automation of open-ended conversation, we introduce "voiced NPCs", non-player characters whose dialogue is provided by a human being.

We illustrate this idea in *Persiflage*, a CRPG where players are represented as avatars in a graphical virtual world, using a traditional game controller to explore this world. Unlike traditional CRPGs, however, when talking with NPCs, players speak out loud using unrestricted natural language. Players are unrestricted in what topics they raise with NPCs, and in how they express themselves.

This paper shows the effect of open-ended conversation on play of a CRPG. We explore how players present themselves verbally and engage in storytelling when given the ability to talk in their own voices. To investigate these questions, we conducted a study where five groups of three people were recruited to play through a murder mystery plot in *Persiflage*, where their utterances were recorded and then coded. The groups were split into two players and one *orchestrator*, whose primary job was to give voice to non-player characters. We found that players engaged with the game's goals and used open-ended dialogue to advance the story's plot, sometimes in unexpected ways. Players did not constrain themselves to the game's mediaeval setting, instead opting to import their own humour and anachronisms. We found that permitting open-ended conversation in a CRPG led to vibrant, humorous, and light-hearted interaction, while remaining grounded in the game's setting and goals.

We distinguish this approach of enhancing a CRPG with voiced NPCs from the use of a game master (GM) in traditional pen-and-paper role playing games such as Dungeons and Dragons [12]. Our approach extends CRPGs to have more intelligent NPCs without otherwise changing the presentation or interaction affordances of the game. Voiced NPCs give a hint of how CRPGs would be played if the artificial intelligence directing the behaviour of NPCs were powerful enough to support open-ended conversation using natural language. In contrast, GMs take the much broader approach of narrating and guiding the game as a whole.

In this paper, we first review approaches to improving the flexibility of dialogue in digital games, then describe *Persiflage*, our game incorporating voiced NPCs, and finally present our study of open-ended conversation in CRPGs.

2 Related Work

Murray describes the idealized vehicle for interactive narrative as Star Trek's fictional Holodeck [17], where users assume the role of characters in a holographic environment and interact using natural dialogue. Current digital games are far from this ideal, limiting players' interaction with characters in the game to selecting among choices that have been provided by the game's designer.

Clicking through dialogue trees to advance conversations is a form of *hypertext fiction*. A story is created through a combination of fragments (or *lexia*) [19]. Players make decisions by selecting which story-block to follow next. These blocks and the corresponding available choices must be carefully arranged to preserve the logical and temporal consistency of the resulting narrative arc [22]. While the player has agency around the choice of which story-block to select, their choices are limited to the content created prior to delivery, and players lack any true sense of authorship over the resulting creation [25]. This is the state of

the art found in popular computer RPGs such as Bethesda's *The Elder Scrolls 5: Skyrim* [4], or Bioware's *Mass Effect* series [5].

Some early explorations have permitted players to interact with games using natural language. In *Facade*, players speak with AI agents using typed dialogue [15]. In a study of three natural language games, Lessard concludes that players have a large degree of freedom to explore humorous interactions if they are willing to forgive the errors and limited knowledge of parsers [14]. While artificial intelligence has helped with personalization of narratives, current techniques are still far from allowing open-ended dialogues supporting compelling narrative progression [15].

Another approach is *game orchestration*, where a human directs the operation of the game at runtime. Crabtree et al., for example, use *orchestrators* to guide the narrative in large-scale pervasive multiplayer game [9]; similarly, in *Egyptian Oracle*, a *puppeteer* controls an avatar that interacts with an audience in an augmented reality performance [11]. In *game sketching*, a designer manipulates the progression of a game in real-time, allowing testing of game ideas before they are fully implemented [1]. For example, in *Raptor*, an orchestrator uses a tabletop interface to manipulate the content of a game world, while a play tester plays in real time [20]. Allison et al. used an orchestrator to implement a helper in the game *Minecraft*, to aid and advise players in building tasks [3]. In these approaches, the orchestrator's role is to enhance the experience of players, allowing open-ended interaction that would not be possible with AI alone.

In multiplayer games, voice interaction is often used by players to rapidly coordinate intense encounters where typing would be too slow [2, 6]. During less frantic episodes, players use voice channels to banter and maintain a social environment in game. However, Wadley et al. find that not all players are comfortable with the increased social presence attendant to broadcasting one's voice online, especially amongst relative strangers [24], and tended not to speak in character while using voice technology.

There has been little study into how open-ended dialogue affects play. There has, however, been research into how players interact in traditional pen-and-paper role playing games, such as Dungeons and Dragons [12]. Unlike CRPGs, pen-and-paper RPGs are based on imagination; the game master (GM) describes verbally what players see, and acts out the role of characters they encounter. This affords the open-ended interaction that is absent from digital role-playing games. The voiced NPCs introduced in this paper are best viewed as an enhancement of CRPGs rather than an attempt to digitize the pen-and-paper RPG experience. Nonetheless, it is helpful to review how players interact in pen-and-paper RPGs. Tychsen discusses that control lies mainly with the GM, who has conceived a story from prepared material. The GM is able to retain control whilst providing an illusion of choice to the players. This is likened to the situation in CRPGs where player choice is limited by the predetermined dialogue structure. Although a GM can impose their will on players, there is always some degree of improvisation and change in plans as the game progresses.

Fig. 1. (Left) Players of *Persiflage* are collocated, sharing a couch and TV. In conversation, the orchestrator's voice is played through the television set. (Right) The players' characters are dressed in blue and red in their shared view of Northaven.

3 Open-Ended Dialogue in Persiflage

We designed *Persiflage* to explore the effect of open-ended dialogue in digital games. *Persiflage* is a computer role-playing game where the non-player characters (NPCs) are voiced by a human being. These orchestrators use a special interface to move and animate NPCs and to play the NPC's part in conversations with players. This removes the restrictions of rigid conversational systems, allowing players to express themselves as they choose. *Persiflage* allows us to address our primary research question of, how do players in fact choose to express themselves when such freedom is given?

As shown in Figure 1, Left, two players each control an avatar using a standard game controller. Players are collocated, sharing a single display. Players view a cartoon-style fantasy village containing streets and buildings (Figure 1, Right). Players move their avatars using the joysticks on their game controllers, and interact with NPCs and objects using buttons on the controller. Various NPC villagers are located around the fictional village of Northaven. To advance the plot, the players must talk to the villagers to gather information.

An orchestrator sits in another room (figure 2, Right), and uses a special interface to control the NPCs (figure 2, Left). The orchestrator can draw a path for an NPC to follow, and can trigger NPC animations (e.g., talking, waving) using buttons on the interface. For context, the orchestrator sees an inset view of the players' view (top-right of figure 2, Right). Players and orchestrators speak to voice their characters. The conversation is transmitted between the two rooms using voice over IP. The orchestrator's voice plays through the speakers on the television, helping to convey that the NPC is talking. Players are aware that a human orchestrator is voicing the NPCs.

Persiflage is a murder mystery with story-driven gameplay where players need to question, coerce, and beg the NPCs for information and clues. The players take on the role of investigators that have arrived in Northaven in pursuit

Fig. 2. (Left) An orchestrator manage NPCs and items, and uses a headset to voice the NPCs. (Right) The NPC in the centre moves along the path traced out by the orchestrator in red. The blue buttons allow the orchestrator to trigger speaking and waving animations. The window inset in the top-right shows the players' view.

of a fugitive named "Helena". They must interact with residents of the town – the voiced NPCs – to find and bring Helena to justice. As the players explore and interact with the townsfolk, they collaboratively build a story with the orchestrator. Northaven is a mediaeval townscape consisting of homes, farms, a church, an inn and a market square. Six NPCs inhabit the town.

3.1 Digital Northaven

The townscape is still and lifeless until the orchestrator starts moving the NPCs and responding to the players in conversation. The items in game are deliberately generic and can take on different meanings under different situations. A vial of red liquid might be an ominous sample of blood or a potent truth serum; a bound tome can become Helena's diary or a priest's lost bible. We leave it up to the orchestrator and players to build their own stories using the digital pieces.

The opportunity for open-ended interaction poses a challenge to both the orchestrator and players. The players are invited to be inventive in the portrayal of their characters. The orchestrator on the other hand must be ready to react to unforeseen player requests.

Players can engage NPCs in conversation by walking up to them and pressing the "A" button on their controller. The interface zooms to focus on the NPC's face. The orchestrator can activate talking animations, giving the impression that when the orchestrator talks, their voice is coming from the NPC's mouth.

None of the dialogue in game is scripted outside of notes that the orchestrator has prepared. Players are initially aware only of the fact that they are searching for a fugitive named Helena, and must invent all their conversation on the fly. The orchestrator must also improvise dialogue during play in response to the players' questioning. This allows players to express their creativity without being restrained by a script.

4 Study Method

To explore how players and orchestrators approach open-ended conversations in CRPGs, we performed an exploratory study where we observed play of five groups of three participants. We recruited these participants from the university community using an advertisement posted on Facebook. Participants were asked to form their own groups of three members and to choose who would play the roles of players and orchestrator. Participants ranged from 19 to 27 years in age with a mean of 23 years. 6 participants were female, and 9 male.

The orchestrator attended a training session before the study to become familiar with the story and the orchestrator interface. The orchestrator was presented with a document outlining the murder mystery story: the two players play detectives in pursuit of "Helena", a woman wanted for an unspecified crime. The chase has led them to the town of Northaven where some of the villagers have conspired to fake her death. The document briefly described each of six NPCs, to help the orchestrator in creating dialogue for the NPCs during the game. The orchestrator was shown how to move NPCs, activate their animations, engage in conversation with players, and create, move, and destroy items (figure 2). This training session occurred the day before the actual play session.

4.1 Play Session

At the beginning of the play session, the game and its user interface were demonstrated to the players, including how to move, enter, and exit a conversation with an NPC, and pick up, drop, and trade items. They were then allowed to experiment and familiarize themselves with the controls, until they reported that they were comfortable. This took approximately five minutes. The players were given the premise of the game, and instructed to solve the mystery as best they could. The play session was allowed to run to its conclusion or for thirty minutes, whichever occurred first.

The session was recorded with two separate video cameras, one for the players and one for the orchestrator. The Skype call between the parties and a screen capture of the orchestrator's screen were recorded. A transcript of their speech during the session was taken from the recordings and coded for interesting behaviours. The transcribed dialogue was split into utterances on which we employed an open coding approach [21] to identify interesting speech patterns.

5 Results and Analysis

Persiflage was created to enable natural language interactions in CRPGs, enabling open-ended dialogue between players and NPCs. These results show how players and orchestrators exercise this freedom of interaction. We coded *players' choice of language*, indicating how players and orchestrators engage with and invest themselves in this type of gameplay, and the *content of their conversation*, showing the players' engagement with the game's goals and objectives. The following sections present these codes.

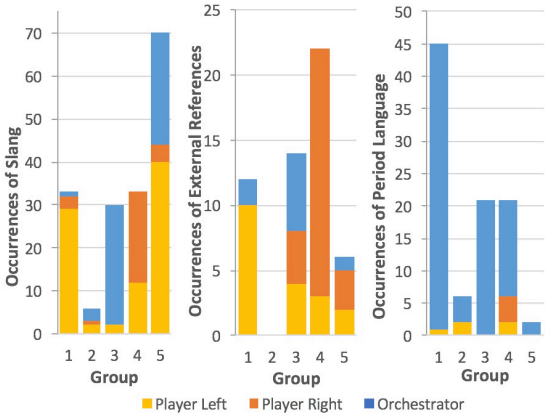

Fig. 3. Occurrences of slang, external references and period language

5.1 How Players Present Themselves Verbally

In *Persiflage*, the opportunity to use natural language in conversation with NPCs allows players to adopt richer personalities in the game. The style and language of players' conversation indicates their attitude toward the gameplay. Just as film and theatre might be comedic or dramatic, the atmosphere of a game can vary as well. By looking at how players and the orchestrator chose to present their characters, we can see the atmosphere and tone they intended in their play of *Persiflage*. We selected three codes as characterizing players' language: the use of *slang*, *external references*, and *period language*. Figure 3 shows the counts of these codes.

Slang indicates that an utterance contains modern vulgarisms or vernacular that are out of place in the mediaeval village in which the game is set. An utterance coded as an *external reference* alludes to knowledge or ideas outside the game world. External references were further sub-classified as *inside jokes*, *current events*, and *pop culture*. We coded utterances for *period language* when the speaker deliberately used language outside of colloquial norms to suggest a different setting and era. Such language need not be an accurate representation of mediaeval speech; in particular, Reichert has coined the term "RPG-Dialect" to describe faux-period language "that makes liberal use of 'thous', 'thees', and 'mi'lords"' [18].

As shown in Figure 3, the use of slang is by far the most prevalent, and is seen in all five groups. We see 30 (5.6%), 6 (1.3%), 32 (8.2%), 33 (5.2%), and 70 (14.4%) utterances that contain slang in groups 1 through 5 respectively. Of the 171 utterances coded for slang, 111 came from players and 60 from orchestrators. External referencing was seen in four of the five groups. Groups 1, 3, 4, and 5 made 11 (2.0%), 12 (3.8%), 21 (3.3%), and 6 (1.2%) reference utterances respectively. Of 53 utterances coded as references, 7 were made by orchestrators

and 46 by players. Period language was present in all five groups, with 33 (6.1%), 7 (1.3%), 23 (5.8%), 31 (3.3%), and 2 (0.4%) occurrences across the five groups. The use of period language was higher in groups one, three, and four, and notably less in groups two and five. We observed 74 of 83 occurrences of period language in orchestrators' utterances and 9 in players' utterances.

The above numbers show that players made use of slang and references more liberally than orchestrators, who in turn were more likely to employ period language. This example from group one shows the players using slang whilst the orchestrator uses more formal language:

Player Left: What up?
Player Right: ⟨laughter⟩
Magistrate (voiced NPC): What are you doing in my town?
Player Left: We're looking for Helena, where she at?
Player Right: ⟨stifled laughter⟩ . . . where she at. . .
Magistrate: As far as I know, Helena's passed away.

Player Left greets the magistrate using slang, and the orchestrator voicing the magistrate responds sternly, modeling his character's speech to the game setting. Despite the magistrate's suggestion of the game taking place in a past era, the player insists on using another colloquialism, "where she at?". The resulting dialogue is asymmetric, with a comedic dissonance between the player's and NPC's speech. The absurdity of the interaction is not lost on Player Right, as shown by her reactions and laughter during the dialogue.

Another example shows the use of an external reference. Player Left compares an antagonistic authority figure to U.S. president Donald Trump:

Player Left: Are you the mayor?
Magistrate (voiced NPC): I'm the magistrate.
Player Left: Is your name Donald Trump?
Player Right: ⟨laughter⟩
Magistrate: Uh, it's actually Rufus.
. . .
Player Left: Where's Donald Trump, aww geez, oh.

This example shows Player Left using her knowledge of the outside world to inject humour into the game. The humour is well-received, as shown by Player Right's laughter. The juxtaposition of modern people and ideas with the setting of a sleepy mediaeval village adds levity to the dialogue. The resulting experience is not unlike a pantomime play where a classic story is presented with a modern and cheery slant, making liberal use of anachronistic references to current events and culture. Whilst the reference in the example above is anachronistic and introduces knowledge that the character would not possess, it nevertheless relates back to the game world, in this case by drawing an analogue between the fictional character and the real-life politician.

External referencing and slang are both used to provide humour and a personalized game experience leveraged from the modern social zeitgeist. Period

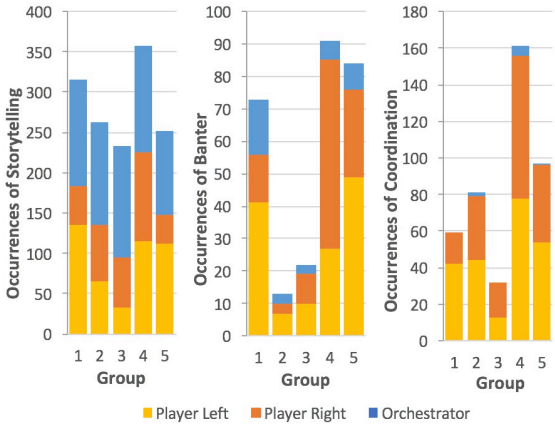

Fig. 4. Occurrences of utterances coded for storytelling, banter and coordination

language, conversely, indicates a desire to play in character and to provide a more (or possibly mock) authentic game experience. Players overwhelmingly display a higher propensity to use slang and external references than orchestrators, whilst the inverse is true for period language. Orchestrators are more invested in authenticity whilst players are content to make jokes and enjoy the experience less rigidly.

5.2 Storytelling

The presence of open-ended dialogue gives players the opportunity to contribute to the story by adding to the story arc, or to step out of the story, e.g., by telling a joke unrelated to the game. Coding revealed that utterances fell into one of three categories, denoted as *storytelling*, *coordination*, and *banter*. Figure 4 shows the counts of these codes.

A *storytelling* utterance seeks to advance the story. These usually take the form of a player posing a question to an NPC, or conversely, the orchestrator responding to a player's question. An utterance that helps participants plan or otherwise coordinate their activities is coded as *coordination*. These mostly involve players summarizing their gathered knowledge, or planning their next step in the adventure. An utterance is coded as *banter* if it represents some form of repartee that does not contribute to the game's goals. This could include inserting a joke or an external reference into conversation.

Of the three categories, storytelling utterances are the most common, accounting for 315 (58.6%), 259 (61.1%), 232 (64.1%), 358 (56.5%), and 251 (51.5%) of total utterances over the five groups. Orchestrators devote more of their utterances towards storytelling than the players, averaging 86.4% and 44.3% of total utterances respectively. Storytelling utterances represent the heart of *Persiflage*, where players interrogate, beg, and intimidate the NPCs for information and

clues. The fact that almost half of players' utterances are related to storytelling indicates that despite the levity noted earlier, players were seriously engaged in trying to solve the mystery.

Coordination utterances account for 10.3%, 16.9% 8.3%, 23.0% and 17.1% of all utterances in groups 1 through 5. In theory, these utterances ought to be produced exclusively by players. We expect players to summarize and plan without the involvement of orchestrators, who play exclusively in character as NPCs. However, on rare occasion, we saw orchestrators contributing their own coordination utterances, commenting on players' observations or correcting their erroneous assumptions.

Three groups engaged in significant banter; in groups 1, 4, and 5, banter accounted for 11.9%, 14.5%, and 17.2% of total utterances respectively. The other two groups engaged in little banter, accounting for 3.3% and 5.2% of total utterances in groups 2 and 3. We observed bantering as a behavior more frequently in players than in orchestrators. In all groups, the players made more banter utterances (13.0%) than the orchestrator (4.9%). In the following typical example of banter, the exchange does not advance the story, but stays within context of the game:

Player Left: Hey.
Hamish (voiced NPC): Hello again, it's me Hamish.
Player Left: Hey Hamish, so what's up?
Hamish: Uh, I've just been enjoying that cheese you gave me, it's quite tasty. Although it was a little dusty from the floor you found it on.
Player Left: It's not really our fault, it's the only place that people put cheese around here.
Hamish: Well it's mostly your fault.
Player Left: Quiet now.
Hamish: ⟨laughs⟩
Player Right: So, we lost the diary?

The orchestrator responds to the open query, "Hey Hamish, so what's up" by recalling a previous interaction and introducing some humour from the absurdity of finding cheese on the floor. This sets off an exchange between Player Left and Hamish which does not advance the story, but adds levity to the conversation. The example concludes with Player Right redirecting the interaction back to storytelling. While banter is humorous and does not advance the story, it remains rooted within the game world. Similarly, players are happy to mix banter and coordination in conversation with each other:

Player Right: We're getting mixed stories here. I feel like a real investigator, okay so...
Player Left: ... this is not a field.
Player Right: This is not a field.
Player Left: This just proves that women with cats are crazy.
Player Right: He said to our left?
Player Left: Maybe [orchestrator] doesn't know directions; I'd believe that also.
Player Right: Maybe he's thinking his left?

Here the players have just finished talking with NPC "Annie", and they jokingly comment on the ambiguity of the the directions they've recieved. Player Left makes a joke referencing the trope of the "crazy cat lady". In the short excerpt, we see the players seamlessly coordinate their movement, banter about the reliability of the NPCs, and tease the orchestrator on his ability to correctly give directions.

Orchestrators devote most of their play to storytelling, accounting for approximately 85% of their utterances on average. The players ask the NPCs questions, but contribute fewer storytelling utterances. This is not entirely surprising considering that the orchestrator controls all the facts of the mystery and slowly reveals them to the players over the course of the game. Players on the other hand, must interact with their co-player to coordinate in addition to talking with the NPCs. We see that participants are content to mix in banter whilst both progressing the story and coordinating between players. Players drive most of the bantering, which is consistent with our earlier observations that players adopt a less formal manner than orchestrators.

6 Discussion

To better understand how players engage with *Persiflage* we can look to the concept of the magic circle. Johan Huizinga coined the term "magic circle" to denote a boundary, not only in space and time, but also as a societal construct, that delimits where and how a game and play occurs [13]. The magic circle establishes behaviours, etiquettes, regulations and their adherent consequences that form the terms of a game, separate from society as a larger whole.

In the context of playing a character, behaviours within the circle are those that an in-game character might exhibit. Behaviours outside of the circle are those that we would expect the player as an individual outside of the game to show, but that their assumed characters could not exhibit. For example, contextually leaving the game and discussing a school assignment breaks the magic circle. Williams et al. argue that roleplay cannot exist without a strong magic circle [26]. However, both Consalvo [8] and Castronova [7] argue that the magic circle can be porous.

In the terminology of Montola [16], *Persiflage* expands the magic circle in the *societal* dimension. Players and orchestrators take on two distinct roles; as a game player as well as an audience to their fellow players' performances. Orchestrators and players, as they were observed in this study, exhibit not only the characters of their game world personas, but also their own personalities. We see this as they incorporate current affairs, private jokes, and shared experiences into their game dialogue. By using the freedom afforded by open-ended natural language, players adapt and modernize *Persiflage*'s environment, expanding the social contract they play under and in turn redefine their shared reality of the game. Fine describes these behaviours in terms of *frames*, defined as distinct worlds of knowledge [10]. Players and orchestrators in *Persiflage* switch fluidly between the primary frame of reality and that of the game world, some-

times within the same sentence. The characters within Northaven maintain an open awareness between the two frames, giving rise to quips about contemporary politics and the use of modern slang and colloquialisms whilst playing in a mediaeval fantasy world. Fine explains that in the informal setting of fantasy gaming, this form of banter and the maintenance of multiple selves is common amongst players and does not usually lead to confusion.

Our findings mirror these observations. Players and orchestrators used natural language interactions in full confidence that they would be understood by the others. Participants were aware that they were playing a game with friends, and felt comfortable stretching the magic circle. They took ownership of the game, incorporating their own ideas, views, and experiences to entertain both themselves and their peers. Rather than finding the magic circle porous, we find it to be expansive and elastic, stretching beyond the borders of Northaven to include colloquial vernacular and references to modern day pop-culture and politics. Yet the magic circle is strong enough that the players and orchestrator stayed rooted in the game for the duration of the play session. Figure 3 shows that players were the principal instigators in stretching the magic circle with jokes and slang, whilst period language originated almost exclusively from orchestrators. The clash of styles makes for humorous dialogue exchanges.

Even though orchestrators are not as active in expanding the magic circle, our examples showed that they played along when the players did so. For example, orchestrators happily acknowledged the absurdity of finding cheese on the ground. Both players and orchestrators committed fully to play. When playing *Persiflage*, all participants gave their full attention to the game. Banter and external references unfailingly alluded to in-game devices or events. We observed no events where players opened topics unrelated to the ongoing game.

As we saw earlier, orchestrators stretch the edges of the magic circle to a lesser extent than players. The banter they engage in is topical to the game setting, providing idiosyncrasies to their characters, and making small talk and gossip that one might expect in a quaint medieval village. Players, on the other hand, incorporate pop-culture and current politics in the service of humour.

7 Conclusion

In this paper we have explored the effect on play of computer role-playing games of permitting free-form dialogue between players and NPCs. To study this question, we introduced *Persiflage*, a novel digital RPG that employs a human to voice NPCs. Through open-ended natural language, players deliberately derived humour from the absurdity of mixing modern popular culture with *Persiflage*'s mediaeval setting. The orchestrators who gave voice to the NPCs were more rooted within the game world, using less slang, and more period language, resulting in asymmetric and humorous dialogue.

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