The Social Side of Gaming: A Study of Interaction Patterns in a Massively Multiplayer Online Game

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ABSTRACT

Playing computer games has become a social experience. Hundreds of thousands of players interact in massively multiplayer online games (MMORPGs), a recent and successful genre descending from the pioneering multi-user dungeons (MUDs). These new games are purposefully designed to encourage interactions among players, but little is known about the nature and structure of these interactions. In this paper, we analyze player-to-player interactions in two locations in the game Star Wars Galaxies. We outline different patterns of interactivity, and discuss how they are affected by the structure of the game. We conclude with a series of recommendations for the design and support of social activities within multiplayer games.

Categories and Subject Descriptors

H.5.3 **[Group and Organization Interfaces]**: Synchronous interaction.

General Terms: Human Factors.

Keywords: Multiplayer games, social interaction, interactivity, design recommendations.

1. INTRODUCTION

Contrary to popular belief, playing computer games is not a solitary activity but more and more a social experience [12]. Starting with MUDs (Multi-User Dungeons) in the late seventies, players and designers quickly took advantage of the capabilities offered by the Internet to build complex online social worlds where people could meet and play [2, 3]. In a more recent genre of computer games (Massively Multiplayer Online Role-Playing Games, or MMORPGs), descending from these MUDs, hundreds of thousands of players now interact on a daily basis [28]. Will Wright, creator of the famous game "The SIMS", described this trend clearly: "In some sense, what we're really building with these games are communities. That's our primary thing" [29].

Despite the fact that many games are now built purposefully to encourage social interactions however, it took a long time for

research to start investigating them as full-fledged social milieus – perhaps because games are often seen as "frivolous" and unworthy of attention compared to more "productive" activities [5]. For instance, after the creation of LambdaMOO at Xerox PARC, Curtis [3] was one of the first to seriously examine patterns of social interaction in these particular online communities – almost 15 years after the creation of the first MUD.

The social nature of most recent games has important consequences for their design. Designers want to promote interactions among the players, as they recognize that these encounters are essential to the success of their virtual worlds. Indeed, most of the activities offered by a MMORPG (e.g. developing a character, fighting monsters) are already present in single player games. Some players are quite content with accomplishing these simple objectives: as Bartle [1] outlined early on, not all participants in a multiplayer environment are here to socialize (see his "achiever" and "explorer" types, for instance). Still, what makes a difference for many players is the shared experience, the collaborative nature of most activities and, most importantly, the reward of being socialized into a community of gamers and acquiring a reputation within it [11, 30]. These shared experiences, in turn, can greatly increase the appeal and longevity of the game. For instance, it has been argued recently that they can form the basis of player-created stories that can be much more appealing than what designers can provide [27].

As a consequence, most MMORPGs are structured so that players are forced to interact. EverQuest is a good example of a successful attempt at encouraging player-to-player interactions: the "quests" players have to accomplish are purposefully too difficult for a single character, and require the help of a group of other players. As Jakobson and Taylor have proposed, EverQuest is "one of the best examples of explicit socialization processes embedded in a game" [11]. In more recent games like Star Wars Galaxies (SWG), the interdependencies between players are even deeper and broader: a complex ecology of professions forms the basis of an economic system where players must cooperate and exchange goods and services, as they would not be able to progress otherwise.

Despite the importance of player-to-player interactions in MMORPGs however, little is known about how they actually take place within the game. For instance, little data is available to judge the level of interactivity between the players. The nature and content of these interactions are also hard to evaluate: do players genuinely share a good time together or are they simply coordinating around purely instrumental goals, soon to forget about the person they interacted with? These are important questions for the design of future online games: again, the quality of their social environment probably contributes significantly to their eventual success.

As part of its investigation of the social dimensions of multiplayer online games, the PlayOn project is trying to shed more light on this specific issue. In particular, we observed a wide range of in-game interactions using complementary approaches (qualitative and quantitative) in order to evaluate how successful MMORPGs are at encouraging interactivity between their players. Based on the analysis of interaction logs and video recordings from the MMORPG Star War Galaxies, complemented by a three-month ethnography of the same environment, we describe the nature and structure of player-to-player interactions in this recent multiplayer game. Based on these observations, we propose ways of better supporting social activities in online games.

We begin below with a description of the particular MMORPG we studied: Star Wars Galaxies.

2. Some Background on SWG

Star Wars Galaxies (SWG) was, at the time of our study, the most technically advanced MMORPG available. Launched in July 2003, the game was highly anticipated. On top of a well-recognized franchise and a compelling game universe, SWG promised to be more than EverQuest, the most popular MMORPG to date. Indeed the designers wanted to produce a game where the gameplay would not revolve almost exclusively around killing monsters and gaining levels, but would instead offer numerous interesting non-combat-oriented player professions. In other words, SWG was a direct attempt at better supporting the more social character of multiplayer games. Its lead designer, Raph Koster, publicly discussed its vision for a game that "reward[s] all the people who make the game world a more livable place […]: the ones who provide entertainment, the ones who are in support roles or peaceful roles or economic roles" [14]. This made it a particularly interesting object of study for our research.

Despite these noble goals SWG suffered from many problems in the few months following its release, and was widely criticized as an incomplete product. Membership fluctuated as a result but, with the release of several patches and improvements, the game now seems to have reached a more stable state. After a rocky start, SWG now claims to have about 400,000 subscribers. This is certainly not marginal and places the game among the most popular examples of its genre.

Figure 1 – SWG's interface

The game takes place in a rich, detailed 3-D environment reproducing the Star Wars universe (see Figure 1). The general mechanics of the game are similar to other MMORPGs. Players control an avatar in first- or third-person mode, and progress is based on accomplishing missions and other game objectives. Where SWG differs from other games is in the complex network of interdependencies built between players, as we explain below.

2.1 Player Interdependencies

Although our point is not to offer a comprehensive review of the game, it is important to explain how the game structures the interactions between its players. Like many other role-playing games, SWG lets you create a character based on a series of attributes (e.g. gender, race). The physical appearance of your avatar is highly customizable, allowing you to create a distinctive looking in-game persona. But the most defining attribute of a character will be its profession. In SWG, professions can be separated into three groups: combat-oriented (e.g. marksman), service-oriented (e.g. medic, entertainer) and product-oriented (e.g. artisan). The initial profession you pick determines the core set of skills available to you in the game. To progress in them, you will need to gain not "generic" experience points but instead experience specific to your particular skills: for instance medics progress by healing other characters, not by shooting enemies or building houses.

Professions have an enormous impact on the interactions between players. Indeed all of them are essential to the game, and they were also purposefully designed to be interdependent. To pick a simple example, marksmen need medics and entertainers to heal their wounds and battle fatigue. Medics, in turn, need wounded marksmen to heal and scouts to procure the resources needed to make drugs. Entertainers need tired combatants to relax but also tailors to manufacture their stage outfit. The list could be much longer: there are 8 basic and 30 advanced (or "elite") professions available, all interrelated. This ecology of professions is an important framework shaping player-to-player interactions.

The economy also plays an important role in this online world. It is, by design, entirely player-driven [14]. Players need to procure the items necessary for their trade, and crafters need to find outlets for their wares. In SWG supply meets demand in several ways. Each city has a bazaar where anybody can sell goods, either at a fixed price or at auction. The bazaar, however, is limited to relatively inexpensive items (there is a cap on the maximum sale price) sold in small batches (a player cannot have more than 25 items on it at any given time). To sell more products at a higher price, players need to either develop some business skills or find someone with these skills to place a "vendor", in a house or other structure. Vendors are usually where the higher end, rare items can be found. Finally players can trade directly with each other, without intermediation, if they happen to know they have things they both need.

As must be clear by now, the professional system and the economy in SWG are both structured so that players have to interact. Other, more classic techniques are also employed: like EverQuest for instance, some "dungeons" in SWG are too difficult to be visited alone. Players need to form a well-balanced group before venturing into these dangerous spaces. Coordinated combat is another mechanism through which people cooperate and socialize.

All of this brings us to another central aspect of the game: the importance of the organization of space. Indeed if players are to interact, they have to meet in the first place. In SWG space has been organized so that players have to congregate in certain locations.

2.2 The Importance of Space

There are currently 10 planets in Star Wars Galaxies. Each is home to several cities of various sizes, which have been placed either by

the game designers or later created by the players themselves. Each city, in turn, contains a variety of buildings, many of which have a specific purpose.

Most cities in SWG have starports/shuttleports, medical centers, cantinas, theaters, hotels, and cloning stations. Each of these buildings enables players to perform certain actions that cannot be performed just anywhere. For instance, people gather in cantinas in part because they are one of the few places where entertainers can heal other players' battle fatigue. There is therefore a strong incentive for entertainers to stay in cantinas, waiting for tired combatants to come watch them. Moreover, recovering from battle fatigue is not instantaneous: combat characters are forced to wait for at least a few minutes when they visit a cantina. This system has been put in place by the developers specifically to encourage player-to-player interaction. The rationale is that players can use these periods of "downtime" to engage in small talk with each other. In fact Koster even states that this is a law of online world design: Socialization Requires Downtime [14].

The same principle has been applied to other locations in the game. For instance, beginning medics can only heal wounds in medical centers[1]. As a consequence, medics often wait in the medical centers of the major cities for wounded players to visit. As healing takes time, doctor and patient can use it as an opportunity to interact with each other.

Another important interaction spot is the starport. Players often need to travel from one planet to another, either to accomplish a mission or to find a vendor for a specific, rare item they need. Travel, however, is not instantaneous: shuttles fly every 9 minutes and, unless you happen to be lucky and catch one just in time, you will usually have to wait for a while. Again, this was designed so that players would have opportunities to "bump into each other", have serendipitous interactions, and eventually form relationships.

At this point we have seen the reason why players have to interact (the professional and economic interdependencies) and where these interactions can take place (specific locations built to support certain types of services and exchanges). We now turn to how players interact: the game chat system.

2.3 Interaction System

Most interactions in SWG take place via text chat, much like other MMORPGs. There are three main chat modes. In "say" mode, typed sentences are visible to anybody in the vicinity of the player. These messages appear in the chat window of the other players and also in a bubble above the player's avatar, like in a cartoon. In "tell" mode, messages are sent privately from one player to the next. The message is visible only to these two parties, and can be sent across arbitrary distances – the two players do not have to be collocated. Finally in "group" mode, messages are sent to a subset of players who have grouped together. It is similar to a one-to-many "tell": messages are visible only to the group members, and they are not limited by physical proximity.

A feature of SWG's interaction system that distinguishes it from other MMORPGs is its wide library of gestures, or "socials." Players can type commands such as "/smile", "/bow", and "/cheer" to gesture to each other (or themselves). Selecting another player

and typing "/smile", for instance, produces two results: a public sentence of the form "You smile at [target name]" is sent to the other players in the area, and in some cases the avatar's physical appearance changes to reflect the "social" (here, a smile appears on the avatar's face). At the time of our study there were 340 "socials" available to the players. As our observations show (section 4) players use them to enrich their interactions, especially at their beginning and end (e.g. engage another player with a "/wave", "/smile" when receiving a service, and "/bow" to conclude an exchange).

SWG also features a powerful macro system. Players can assemble series of commands, "socials" and utterances and bind them to single keystroke or icon. Macros can call each other and be looped, which allows certain actions to be accomplished entirely automatically and let the player walk away from the keyboard while the character is still active. As we will later see, this also has important impacts on the interactions between the players: sometimes an avatar may give the impression of being actively controlled by a player while it is simply "AFK macroing" (a concept evolved by SWG players to describe this practice of using a macro when Away From the Keyboard, or AFK).

Having painted a broad outline of the game mechanics, with a focus on the aspects most directly affecting player-to-player interactions, we now turn to our analyses.

3. RESEARCH METHODS

To understand the nature of player-to-player interactions in SWG, we proceeded as follows. As a preliminary step, we created characters and conducted a "virtual ethnography" [9, 17] of in-game activities. To balance our view of the game as much as possible, one of the authors selected a combat-oriented profession while the other selected an entertainer (service oriented). We logged in regularly (at least twice a week, sometimes much more, each time for at least two hours) over a three-month period, and progressively became members of the community of players. As our characters evolved, we joined a player city and a guild. All of our activities were recorded using a video camera connected directly to our PC's video cards. This provided us with a rich set of ethnographic data, framing our understanding of the game.

As part of our qualitative observations, we identified the locations that were the most heavily trafficked by players. These were the cantina and starport in Coronet City, the capital of the planet Corellia (the most centrally located in the galaxy).[2] Players can always be found in these two locations, unlike cantinas and starports in smaller cities and on more remote planets which are deserted most of the time. They are places you go to find other players whom you do not already know. The next busiest cantina and starport are in Theed and then Mos Eisley, no doubt due to their prominence in the Star Wars movies.

We then moved on to another phase of our study: we created two additional characters, which we placed in the cantina and in front of the starport in Coronet City in order to understand the nature of social interactions in SWG's public spaces. We kept these characters constantly connected to the server for one month, recording publicly

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[1] Later in the game, advanced medical professions can use medical droids to heal wounds in the field. These droids have to be obtained from a droid engineer, one of the advanced product-oriented character classes – another example of interdependency.

[2] There are 25 SWG servers available (not including the test center's server). Each hosts a self-contained galaxy – therefore, patterns of activity can differ between servers. Coronet City was very active on our server, for instance, but a different locus of activity could have emerged in other servers.

visible activity in these two locations. For this we used SWG's "/log" command, which captures the content of a player's chat box into a text file. This file therefore contains a record of all the public utterances and gestures made by the visitors of each specific location. The entire recording was done automatically by using a macro, and we ended up with a total of 100Mb of chat and gestures data. While this data was accumulating, we continued our ethnographic observations with a particular attention for these two locations.

At the end of our study, we built a series of tools to process the logs. We wrote a small parser (implemented in Perl) to format each line of the logs and extract the most useful data. In particular, our parser relied on a dictionary we also built to reliably identify the gestures used by the players, and their directionality. After parsing, the data was stored into a mySQL database for further analysis. The database had a simple structure: it segmented each event (that is, each line of the logs) into its component parts: who is interacting with whom, in what way (gesture or chat), where (starport or cantina), at what date and time, and what the content of the interaction was (text chat or "social" command). We finally built another series of scripts to extract interesting patterns of information from the data.

In the following section, we will focus our analyses on the log data. Space constraints prevent us from summarizing our ethnographic observations in great detail: instead, we use them as a background to our quantitative analyses, referring to examples of player-to-player interactions extracted from our video data to confirm or infirm the patterns emerging from the logs.

4. PATTERNS OF INTERACTION IN SWG

We collected logs for 26 days. Over this time period we observed 5,493 unique players in both the starport and the cantina. For each day, we have about 21 hours of data (the SWG server we used was rebooted at 4am PST every night, and we could not log back in until 7am).

Figure 2 – The cantina in Coronet City

4.1 The Cantina

Over the 26 days contained in our logs, 3,564 unique players visited the cantina. Of course, not all of them were present all the time. In fact, one of the findings emerging early from our data was that presence is highly asymmetric, with a small number of players present very frequently and a much larger number of episodic visitors. The median number of days of presence was 2 (average: 3.5; standard deviation: 3.05). Only 71 participants (2% of the total)

were present more than half the time (that is, 13 days or more). Figure 2 shows how the cantina looks like on a typical day.
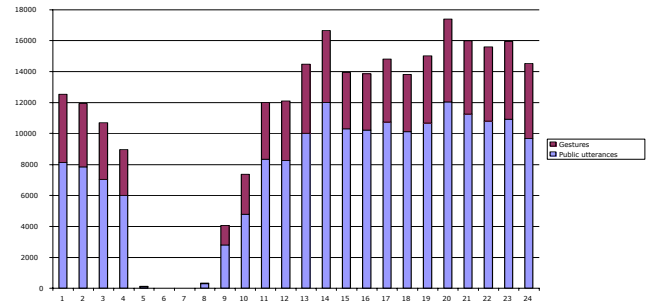

Figure 3 – Temporal activity in the cantina

Activity in the cantina was spread quite evenly across time. Figure 3 summarizes this rhythm by adding the number of events (messages and gestures) for each hour over the 26 days (the gap between 4 and 7am is due to the server reboot mentioned earlier; all times are PST). Activity diminishes slowly from midnight to 4am, down to about a half of its peak value. It then picks up quickly from 8 to 11am. This indicates that players are probably logging in from a wide range of time zones and geographical areas (we met several European players in-game). More importantly it shows that the cantina is never empty, as long as the server is up. At peak times we counted a total of about 15,000 events for each hour, that is, an average of 577 events per hour and per day. About two thirds of these events are public messages, and the rest are gestures.

Gesture	% of total		Gesture	% of total
Smile	18.13%		Thank	15.95%
Cheer	9.57%		Bow	12.29%
Clap	7.77%		Wave	9.81%
Wave	6.27%		Flail	8.17%
Wink	4.22%		Smile	7.89%
Grin	3.72%		Nod	7.03%
Nod	3.23%		Salute	2.48%
Bow	3.22%		Pet	1.95%
Thank	2.51%		Puke	1.89%
Greet	2.40%		Cheer	1.56%
Cantina			*Starport*	

Table 1 – Most popular gestures in the two locations

The cantina's visitors used 317 different "socials" (or gestures). Table 1 summarizes the 10 most popular. It seems that SWG's rich interaction system is a successful component of the game. Unlike the users of other graphical chat spaces [22], the cantina's visitors used a wide variety of the game's 340 "socials" to enrich their interactions. Again, up to a third of player-to-player contacts in the cantina are gesture-based. As in previous studies, it also appears that friendly and positive gestures (e.g. smiles, cheers) far outweigh conflictual or non-committal gestures [22].

Overall the set of gestures listed in Table 1 reflects the kinds of interactions one might expect in the cantina. Visitors cheer and clap for the entertainers; they wave to them to attract their attention, and later bow and thank them for their service. In return, the entertainers wink, grin and smile at their audience.

The general patterns we outlined above, however, do not indicate precisely what kinds of activities are taking place in the cantina. To address this issue we analyzed three dimensions of interactivity: for each player we counted how many gestures they directed to others, how many they received in return, and finally how many public utterances they made. The balance of these three dimensions yields interesting insight into what kind of social environment the cantina is. We normalized the three dimensions for each player by dividing them by the number of days of presence, so that the most frequent visitors did not skew the data too much. After normalization the median number of gestures sent is 0.5 (average 0.73; standard deviation 1.24). The median number of gestures received is also 0.5 (average 0.76; standard deviation 0.98). As for utterances the median number is 3.5 (average 11.47; standard deviation 39.04). Overall this seems to reflect a relatively low level of interactivity: on average a player goes into the cantina, makes about one gesture towards another player, exchanges four sentences with him or her, and receives one gesture in return. This quantitative data is well aligned with our qualitative observations: the majority of players go to the cantina to heal their "battle fatigue." Doing so simply requires watching a dancer or listening to a musician (using a "watch" or "listen" command) for a few minutes. No interaction with the entertainer is required to receive this service. Some players may chat or gesture with the entertainers or even tip them, but the majority does not.
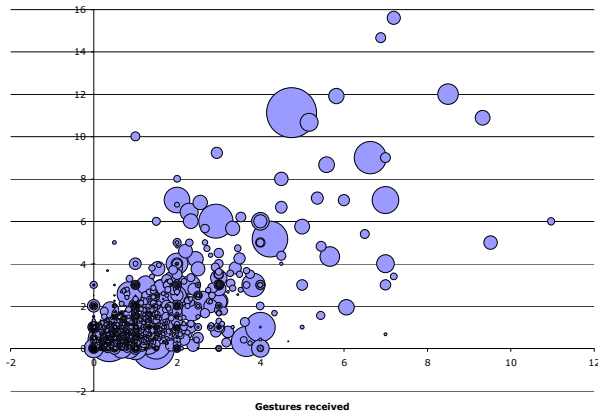

Figure 4 – Interaction profiles in the cantina

Of course these are averaged values over the entire population of players who visited the cantina. To highlight the differences between players we mapped each of the three dimensions on a graph. Figure 4 illustrates different "interaction profiles": each player is represented by a dot on a two-axis grid; the X-axis represents the number of gestures received, while the Y-axis represents the number of gestures sent. The size of each dot is proportional to the number of utterances each player made (Viegas and Smith [25] employed a similar visualization technique in the context of newsgroups).

Starting with the lower left quadrant of the graph, it is easy to see that an overwhelming majority of players are not very interactive: they say very little, and do not gesture more. These players are "the clients": they visit the cantina, get a service, and leave. But this section of the graph also contains another category of players: those making a very large number of utterances but not making or receiving any gestures. Looking at our qualitative data, this pattern is easily explained: these are entertainers running a macro, constantly repeating a message as long as they are logged in. In

cantinas, such messages tend come from dancers and musicians automatically requesting to be healed or tipped[3]:

> 11:33:38 Entertainer A [pleads]: PLEASE TIP WHOMEVER HEALS YOUR MIND

> 22:30:10 Entertainer B [says]: heals welcome. Tips even more welcome. :)

> 16:48:34 Entertainer C [says]: tipping is great, show us you love us please.

Remember our earlier discussion of the game mechanics: to earn experience points, a player needs to perform activities related to his profession. To gain points at an accelerated rate, many entertainers program a macro where their avatar dances or plays music in a loop. This way they can earn experience even when they are not directly playing. As part of their macros, many entertainers repeat messages like the ones above repeatedly. This way, even if they are away from the keyboard (AFK), they can still attract the attention of the cantina's visitors. But while this practice may serve an instrumental function, it adds nothing to the social environment of the cantina: there is no player to interact with behind the avatar – it simply repeats the same message over and over.

The population of the upper-left quadrant of the graph illustrates a variation on the above behavior. Players gesturing and talking a lot, but not receiving any gestures in return, are usually indicative of another type of "AFK macroing" (see section 2.3). The avatar is programmed not only to repeat sentences but also to gesture to whoever is close by. While this may temporarily fool visitors into thinking someone is controlling the character, the same problem as above remains: these avatars are not truly interactive.

This, of course, affects the social atmosphere of the cantina: many players we talked to complained about these "false" entertainers who are no better than non-playing, computer-controlled characters (NPCs). SWG forums also contain many discussions about AFK macroing and its pitfalls. This has even led to parodies suggesting that players could easily create an entirely automated avatar [13]. The following quotes, extracted from our logs, reflect the frustration of the cantina's visitors with AFK macroing:

> 22:17:45 PlayerX: Is there anyone not AFK in here?

> 14:56:06 PlayerY: All these AFK people, trying to get Jedi[4]. It's Pathetic

> 02:14:29 PlayerZ [shouts]: Cantinas are the most ridiculous place and i can complain since no one will hear. id be better off getting a mind buff from a dwarf nuna

On top of being absent from the game, "AFK macro-ers" also have detrimental effects on the quality of interactions in the cantina. When used to repeat sentences over and over, macros resemble spamming - and in fact, several of the participants we observed made this analogy directly:

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[3] Entertainers become tired and require healing in order to "perform" for extended periods.

[4] To earn the coveted Jedi status, players have to reach the "master" level in four randomly assigned professions. This system was much decried by the players: indeed, to be a Jedi many had to play a profession they did not particularly like. As this participant makes clear, it may have resulted in many entertainers "AFK macroing" on their way to Jedi status instead of genuinely playing the part.

23:03:52 Spammer (while on musician macro) [shouts]: Selling a pack of 10 jedi holocrons for 5 million! Send an email if interested and I will get back to you later!

23:05:40 PlayerA: Hi everyone... welcome to the Spamtina :)

23:06:19 PlayerB: quit spaming

23:09:37 PlayerC: holos sell for under 300k now, stop spamming.

23:36:50 Player D: people need to learn that spamming is not a required element of an afk macro lol[5]

As we move to the right of the graph, especially the upper-right, we start to find more interactive players. These are "live entertainers:" they gesture to others a lot, receive a lot of gestures in return, and talk significantly more than average without being overwhelming. Live entertainers include two groups: "socializers" [1] and "master entertainers." The former are simply players who especially enjoy chatting, joking, flirting, role playing, or performing. The latter group includes master dancers and musicians who provide a service: "buffing." In addition to doctors, dancers and musicians have the ability to temporarily raise certain character attributes (mind, quickness and stamina) making them more powerful. Unlike fatigue healing, buffing requires some interaction between entertainer and client. Entertainers must use a command to direct their attention toward the client, and therefore the client must actively request a buff. In addition, like other goods and services in SWG, buffs tend to be provided at a price so there is usually some interaction around the price of the buff and payment for it. Furthermore, at times when there are more master entertainers than clients, there can be competition for business which tends to involve smiling and winking at prospective clients as they walk in the door. Thus, buffing facilitates social interaction much better than fatigue healing.

The categories of socializer and master entertainer are of course not mutually exclusive. Both are closest to the patterns of social activity SWG's designers wanted to promote in cantinas [14]. The following quote from our logs provides a typical example of socializing in the course of buffing:

22:02:31 Dancer: hi

22:02:37 Customer: hello

22:02:39 **Customer nods at Dancer.**

22:02:46 Customer: you mind buff?

22:02:51 Dancer: sure

22:02:52 **Dance focuses his attention on customer**

22:03:49 Dancer: what are you up to tonight?

22:04:02 Customer: heading to endor to hunt

22:05:12 Dancer: will you bring me an Ewok?

22:05:16 Dancer: pleeeeeeese

22:05:24 Customer: stuffed or live?

22:05:28 Dancer: hehe

22:05:32 Dancer: live

22:05:47 Dancer: no stuffed would be less hassle

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5 Lol means "laughs out loud" – an ubiquitous shorthand in SWG and other text-based social environments, used to identify or respond to humorous comments.

22:05:52 Customer: If I can catch one of the little critters, you've got a deal

22:06:00 Dancer: hehe

22:06:05 **Dancer smiles at Customer.**

22:06:05 **Customer smiles at Dancer.**

Overall a contrasted picture emerges from our observations of the cantina. On the one hand we see a lot of short, instrumental interactions. It also seems that a great number of entertainers in the cantina are automatically running macros instead of being actively controlled by players. On the other hand, a significant number of entertainers are genuinely interactive and we see many examples of longer, often humorous interactions. The Coronet cantina is therefore a strange compromise between a "battle fatigue drive-thru" (get healed – whether it is from a live player or not – and leave as soon as possible) and a sociable place where people share a good time (as exemplified by the humorous conversation above).

4.2 The Starport

Figure 5 – The front of the starport in Coronet City

Over the 26 days contained in our logs, 4,668 unique players visited the starport. This number is quite large and covers a significant proportion of our total player population. 2,761 of the starport visitors (59.1%) also visited the cantina.

The temporal structure of activity at the starport follows roughly the same progression as in the cantina: diminishing around midnight and up to the 4am server reboot, then rising again from 7am to 11am. At peak time there are about 30,000 events per hour, that is, an average of 1,154 events per hour per day. This is twice as much as in the cantina. The major difference is that much of the interactions are text messages, not gestures: this indicates a different style of interactions. 270 different gestures were used at the starport - Table 1 lists the 10 most common.

Players visited the starport more often than the cantina. The median number of days of presence was 3 (average 4.21; standard deviation 4.17). 219 players were present more than half the time (4.7% of the starport visitors). This reflects the role of the starport as a transit hub: players have to pass through it more frequently than the cantina.

The normalized median number of gestures sent is 0.1 (average 0.4; standard deviation 0.96). The median number of gestures received is 0.21 (average 0.43; standard deviation 0.89). The median number of utterances is 4.5 (average 14.26; standard deviation 52.73). Overall

players at the starport gesture much less than in the cantina, but tend to talk more. Following the same principle as in the previous section, we mapped players present at the starport according to these three dimensions of interactivity. Figure 6 summarizes this data.
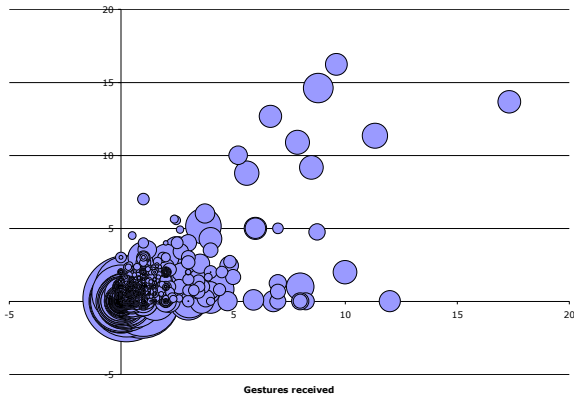

Figure 6 – Interaction profiles at the starport

This graph is heavily skewed towards the lower left quadrant. Here we see first players who do not use gestures at all, but make a very large number of public utterances. Our ethnographic observations reveal that the dominant activity at the starport is advertising. Starports, and especially the one in Coronet, are the best places to reach a wide audience, and players tend to do this by having their characters "shout" messages repeatedly, usually on a macro. They may advertise crafted items for sale, buffs and other services, as well as events in player-created cities. Through such "shout-spamming," players use their avatars merely as a kind of billboard, usually with no player behind it with which to converse. The quote below is a typical example of this practice (see also the chat bubbles in Figure 5):

17:50:37 PlayerX [shouts]: Check out my vendors at 596 - 5156! Resources vendor with many resources including organics!! Also a weapon vendor with many weapons, sea's, loots from the geonosian cave, and also the scythe sword! get it while it lasts!!

Still in the same section of the graph, we also see many players exchanging just a few sentences. This is representative of another pattern of interaction at the starport: training. Once a player has gained enough experience points to progress in a skill (e.g. from novice marksman to rifles level 1), the next level is not automatically obtained. Instead, the player needs to find the proper trainer to teach this skill to him. In each city there are computer-controlled trainers selling skills – for a substantial fee. In another attempt at encouraging player-to-player interaction however, SWG's designers have made it possible for players to train each other. The apprentice receives the skill from another player for free, while the trainer receives valuable apprenticeship training points in return (these are essential to reach the "master" level in each profession).

It can be hard, however, to find another player with the exact skill needed. The densely populated starport with its heavy traffic is therefore one of the best places to look for a trainer. As a consequence, we see many interactions of the following form:

14:22:19 PlayerA [shouts]: anyone teaching hunting3 and trapping2?

14:22:45 PlayerB: yes

[Players find each other; PlayerA trains PlayerB]

14:24:03 PlayerA: thx!

14:24:08 PlayerB: np[6]

Advanced players who really need apprenticeship training points (or AP) also resort to the same form of "shout-advertising" we mentioned earlier:

02:06:59 PlayerX [shouts]: teaching brawler 4004 pikeman 3143 teras kasi 1011 scout 4143 creature handler 1113 and medic 2111, need apprentice point real bad, /tell PlayerX

On Figure 6 most of the remaining players are spread along a line where the number of gestures sent and received is about the same. Most are fairly talkative. These are the service providers operating in front of the starport: for the most part, doctors and "slicers." The former sell "buffs" (health and action). The latter enhance weapons by "slicing" them. Both stand in front of the starport, advertising for their services. As players come to buy these services they exchange sequences of gestures, mostly waves and bows (see Table 2). In return their clients bow and smile at them, or formally thank them. The following example shows a typical doctor in action:

10:31:30 Doctor [shouts]: Mastor Doctor buff. 8k for set!

10:33:25 Bounty Hunter waves to Doctor

10:33:27 Bounty Hunter: can u buff me please

10:34:36 Doctor nods to Bounty Hunter

10:34:51 Doctor: yes have a seat

[Doctor applies buff pack to Bounty Hunter]

10:39:25 Bounty Hunter: thanks for the buff :)

10:39:30 **Bounty Hunter bows to Doctor**

10:40:03 Doctor: np

Overall the starport appears to be a very commercial, service oriented place. As many people transit through it on their way to other planets, it is an ideal location to advertise for services. Some players simply use macros to steer other players to their vendor located elsewhere in a player city or house, while others sell their services on the spot (doctors, slicers). As it is densely populated it also the ideal place to look for a trainer.

5. DISCUSSION

5.1 Building Social Spaces in MMORPGs

Previous studies have shown that even multiplayer games can have fundamental problems in supporting rich social activity, and, thus, "players constantly seek workarounds and external support in order to fulfill their need to socialize" [16]. SWG is clearly an attempt at addressing this problem: the entire game is structured to maximize player-to-player encounters. In particular, space is used strategically in SWG: some locations are either tied to the provision of a particular service (e.g. healing battle fatigue in a cantina) or force people to congregate and wait (e.g. waiting for the shuttle at the starport). While there are other opportunities to interact in the game, these spaces have been purposefully designed to encourage player-to-player interaction. Our study of two of these locations reveals interesting patterns of activity, some pointing at SWG's success in this domain and others showing that progress remains to be made.

There is no doubt that creating interdependencies between characters, and then designing locations where they can be resolved,

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[6] Np means "no problem."

encourage players to get in contact with each other. The cantina and the starport were visited regularly and frequently: players transiting through these spaces feel like navigating a densely populated area, much like a crowded bar or public square. In each location service providers are available to provide what their dependent character classes need. Clients and providers get in contact in these locations and interact based on their game needs. In this respect, SWG is extremely successful: it is simply impossible to avoid talking with another human being. Even the most hardcore of Bartle's achievers [1] would have to exchange at least a few sentences with other players, or their character would perish for lack of healing, equipment, and other necessities.

CSCW researchers have proposed several techniques to foster social interaction in online spaces [15]. Among them, "place-making" or a "sense of space" plays a central role. Indeed space can provide a shared understanding of appropriate use and behavior, as well as a social interpretation of the cues in the environment [7, 8]. For instance, being in a church tells us that raucous behavior is inappropriate [15]. Well-architected physical environments like plazas [26] attract people and have a greater likelihood of unplanned, informal encounters.

Most of the earlier online social spaces were entirely text-based (e.g. MUDs, IRC). What differentiates the newest MMORPGs from these older environments is their rich 3-D worlds. As such SWG tries, by design, to create a sense of space. Its cities are modeled after real world cities and have large public spaces (e.g. the starport), as well as buildings with clearly identifiable functions (e.g. the cantina). However, unlike the effects posited by the research mentioned above, it is interesting to note that the interactions we observed were far from unplanned and informal. In fact, many of them revolve around the provision of a service or a product. Interactivity was also lower than we had anticipated.

Strangely, we think SWG's social spaces may have been "over-designed": since certain transactions can be conducted only in these spaces, they tend to dominate any other possible social activities. This is compounded by the fact that these spaces cannot be easily transformed to support a different conversational setting than what was intended by the designers [7]. For instance, despite its well-architected layout (a main floor and several small, private alcoves to the side), the cantina is a single conversational space: anything that is said and done can be heard everywhere in the building. This prevents players who would like to use the space for other purposes than instrumental exchanges from isolating themselves.

In other words, spaces like the cantina cannot be easily partitioned by their users based on the kinds of social activities they would like to engage into. Alternate definitions of the place collide and conflict: "AFK macro-ers" and live entertainers have a different understanding of what the appropriate behavior is, but they have to share the same floor. Ultimately, the most vociferous users tend to dominate the space: in the case of both the cantina and the starport, players running a macro are the most visible. But a different organization of space could have let them both cohabit more peacefully.

Another problem in SWG's social spaces is awareness. Awareness is defined as "the knowledge of the presence of other people, including their interactions and other activities" [6]. In heavily populated online spaces, which people one should be made aware of and how this should be done are important questions [15]. People need to know if others are really present if they are to interact with them.

Right now, due to the prevalence of macroing, it is hard to judge who is really available for interaction in SWG. This was clearly reflected in our participants' comments in section 4.1. More importantly, it is even harder to know who is available for *what kind* of interaction. Again, some players are quite content to have short, instrumental interactions while others are interested in more sociable encounters. Interaction enablers [10], based on a player's profile, can be used to jumpstart interactions. SWG already offers ways for the players to differentiate themselves based on the interactions they seek: they can label their avatar as a "role player" or "newbie helper", for instance. They can also fill up a player profile and a bio. While we saw evidence during our ethnographic observations that bios and labels are used frequently, they break down in heavily populated places like the cantina or the starport. Indeed, to access this information, one needs to click serially on each player and then examine his or her profile.

However, we think it is possible to work around this problem fairly easily. Names above each player's avatar are already colored blue or violet, depending on a player's factional affiliation (rebel or imperial). This color scheme could be expanded so that other colors reflect a player's past interaction patterns. This way, for instance, socializers could identify at a glance all of the other socializers in the crowd, and target them for interaction.

Overall we think SWG successfully implements many of the recommendations of CSCW research for the design of online social spaces. Still some well-known issues remain, despite years of research on fostering social interaction online. Future MMORPGs would have much to gain from the attention of CSCW researchers.

5.2 Supporting Both Instrumental and Social Play

When talking about player-to-player interactions above, we often used the words clients and providers. This terminology is not accidental: again, our data reveals that social interactivity in SWG is very instrumental. Most players have short, infrequent interactions at both the starport and the cantina. As soon as their needs are satisfied, they leave to pursue other game objectives elsewhere. In this our study reinforces Muramatsu and Ackerman's [18] early research results on the nature of social activity in gaming. In particular, they proposed that "activity on a system can be social without being sociable." Manninen also pointed out that, in multiplayer games, "instrumental and strategic actions have dominance over other action types" [16]. While this does not apply to all the interactions we observed, some of our data certainly supports these findings.

This instrumental orientation to the game is particularly clear in a specific phenomenon we observed: macroing. A large number of the characters populating SWG's spaces are simply on automatic pilot, performing whatever they need to advance in the game. This seems to defeat the purpose of a social space like the cantina: many of the avatars cannot be interacted with while a player waits for his battle fatigue to heal, since they are no more than robots. At the starport, it is easy to be overwhelmed by the number of avatars automatically "shouting" an advertisement for their vendor. All of this is, in many ways, reminiscent of another computer-mediated communication (CMC) environment: Internet-Relay Chat (IRC). On some IRC channels, "bots" (scripts performing automatic actions) can overwhelm participants who are trying to converse with each other, and overall reduce the interactivity of the space [19, chapter 6]. Our participants' comments on "spamming" in section 4.1 reflect a similar problem.

On the other hand, we also identified genuinely interactive players, especially in the cantina. A significant fraction of its visitors not only offer services but also perform for their audience. These entertainers are actively controlled by players and react dynamically to what they see and hear in the cantina, responding with humorous sentences and adequately timed gestures. These players seem to be closest to the spirit SWG's designers wanted to promote in this location.

There is, therefore, a conflict between instrumentality and sociability in the spaces we observed. Since the early days of MUDs, designers have known that each player approaches a multiplayer game with a different orientation [1, 24]. "Power gamers" and "achievers" have a focus on efficiency, on progressing the fastest in the game. Although they are far from asocial (see [24]), they are probably not the ones interested in hanging out in cantinas, chatting with other players – instead, they use a macro to "grind" through levels as fast as possible. "Socializers," on the other hand, are interested in the company of others for its own sake [21] - sharing a good time is what matters. These conflicting objectives collide head-on in places like the cantina or the starport. Hence, an important question for the design of MMORPGs is how to cater simultaneously to these different profiles.

In SWG, the players themselves have addressed this issue by forming homogeneous subgroups. Some player-created cities, for instance, are designated "role-players only", others are defined as mostly social, while yet another category focuses on combat. This is a simple workaround, allowing different player profiles to share the same game. In the main, non-player created cities (like Coronet City) however, such a partitioning is impossible. We think that it should be possible to restructure the game's interaction system so that both instrumental and social players can be rewarded for their activities while sharing the same locations.

Based our data, it is clear that macros are a double-edged sword that designers need to consider carefully. When used to customize the interface and streamline certain activities, they can certainly be very helpful and appreciated by the players. They are also essential tools for the power gamers. However, if they allow a complete range of activities to be performed automatically, they can greatly affect social interactivity. Players are known to ruthlessly exploit any game feature to gain an edge and progress faster [24]. In the case of SWG, this often leads to a simple automation of most tasks, even interactions with others.

In this respect we think SWG's macro system can be almost too powerful. In particular, for the service-oriented professions, it would make sense to check if a player is sitting in front of the screen to interact with others while his avatar loops through scripted behaviors. Players could be rewarded for actively controlling their avatar instead of "AFK macroing", for instance by gaining more experience points for "live" play. The most important point is this: right now, even in games trying to support social interactions like SWG, progress is still tied to the accomplishment of instrumental actions. Entertainers, for instance, progress by healing battle fatigue – a concept simply expressed by having a large number of people clicking "watch" on the entertainer. Since this can be easily automated, there is no point in trying to put together a good performance: one can let the avatar mindlessly accumulate experience points with a macro. Instead, incentives and rewards could be to be built in the game to reward live, social interaction.

To achieve this, we think game designers could probably use social interactivity data to great effect. For our study we used public, easily accessible information. This already helped us understand in-game social activity better and identify problems. In the cantina for instance, simply measuring the number of gestures received is a good way of separating "live" entertainers from those on a macro. Presumably game designers have access to a much larger data set, since they control the servers through which all game data transits. It would be easy for them, for instance, to compute measures of interactivity in all games locations. They could also analyze the social networks that each player is a part of. Similar efforts are under way in the context of other online social environments [e.g. 4, 20, 23, 25], and Raph Koster described similar techniques at a recent Games Developers Conference [14]. We think multiplayer games would greatly benefit from these approaches – indeed, they are built on and extend the possibilities of other CMC environments and could fruitfully reuse some of the earlier research on electronic media. All of this data could then be used to appropriately reward "socializers" while still supporting more instrumental players.

Entertainers, for instance, could be rewarded based on the length and number of conversations they have with other players. Politicians (another social profession in SWG) could be rewarded for their central position in a large, diffuse social network. The possibilities are endless, but it seems social interactivity data is not used extensively. We hope this paper inspires game designers to interact with social scientists to exploit it better.

5.3 Shortcomings and Caveats

We would like to conclude this section with several important remarks. First, our analysis of social interactions in these two locations is not, by any means, representative of the entire spectrum of interactions SWG players have. Our analysis is simply focused on two important locations where, by design, players must interact. During our ethnographic study we had many satisfying, long-lasting interactions with other players that sometimes took place within the noise of Coronet but also in other contexts, such as small hunting, adventuring or combat groups in the wilderness; cantinas and starports in smaller cities; and player-created cities, sometimes with player-hosted events such as guild meetings, parties, weddings, and swap meets. Many of them became in-game friends that we saw on a regular basis. We do not claim that SWG as a whole is not interactive, simply that some public places where this interactivity takes place illustrate avenues for future improvements.

Second, our quantitative analyses are based entirely on publicly observable behavior. There is, however, a lot of activity going on behind the scenes. Players use "tells" and group messages to converse privately, and none of this content was available to us. In fact, the use of private text channels may be increased in busy places like the Coronet starport and cantina. Our ethnographic observations revealed that in places where there is shout-spamming, players often switch to private text channels as a strategy for filtering out the noise. However, we still believe that public data give a reasonable impression of the social atmosphere in the two places we studied, but we acknowledge that this data is in essence partial.

6. Conclusion

Through a complex combination of features, SWG is one of the first attempts at encouraging social interaction in specific game locations. This recognition of the social character of multiplayer games is certainly a step in the right direction, as it helps support a significant fraction of non-instrumental game players (socializers). Our observations of interaction patterns in two SWG locations (the cantina and the starport), however, reveal that some progress

remains to be made for these places to be completely successful. Our data reveals a relatively low level of interactivity between the players, characterized by short interactions centered on instrumental purposes (e.g. getting healed; purchasing services). We believe this stems in great part from a lack of incentives for players to actively engage in non-instrumental interactions in these two locations. In particular, SWG's powerful macro system automates the performance of instrumental action while stripping away any reason to converse with other players. Some shortcomings in the architecture of the game's social spaces, as well as the lack of important awareness data, also compound the problem. We propose that game designers could use social interactivity data, similar to the one we described in this paper, to go beyond this problem and reward the players who make these locations truly social environments. This would allow instrumental and social players to successfully cohabit within these new, expanding online worlds.

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