Massively Multiplayer Online Games as Living Laboratories: Opportunities and Pitfalls

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Introduction

Massively Multiplayer Online Games (MMOGs) have emerged in recent years as an increasingly popular form of entertainment. They offer persistent, richly detailed 3D universes in which players cooperate or compete with each other, trade, and socialize. In this, they share characteristics with the more broadly-defined virtual worlds (VWs), their distinguishing feature being a more objective-driven environment than VWs (in the "sandbox" environment of the virtual world Second Life, for instance, residents are free to engage in any activity they can imagine, unlike online games where players tend to focus on well-defined activities such as combat, exploration, etc.). The most successful MMOG to date, World of Warcraft (WoW), is home to 11 million subscribers worldwide, and several competitors host at least 1 million players or more [20].

Many of the activities offered by a MMOG (fighting monsters, exploring a vast and unfriendly fantasy world, "leveling up" a character and accessing more powerful abilities) are familiar features in videogames, multiplayer or otherwise. What sets these games truly apart are their emphasis, by design, on sociability and interaction between the players. Most MMOGs attempt to foster interactions between their players by using a common template, which could be stereotyped as follows: 1) the player creates a "level 1" character who enters the world with a limited set of abilities and equipment; 2) the player is presented with "quests" (missions) to accomplish; 3) successful completion of the objectives generates "experience points" (or any other similar reward), allowing the character to acquire more powerful abilities and/or equipment; 4) (this is the most important design element) as a player gains in levels, quests become increasingly difficult to accomplish alone, reaching a point where a coordinated *group* of players is required to move further; 5) the size of the group required, the length of the quests or dungeons, and the complexity of the encounters make it nearly impossible to succeed with an ad-hoc group assembled on the spot, creating the need for more formal and persistent social structures: the guilds (or clans, teams, etc. in other game worlds).

While play is often derided as less important than work in the study of human behavior [5], ethnographic studies of the social life of guilds [e.g. 16] clearly show that participating in them actually requires significant efforts to solve problems that are not entirely different from those encountered by groups in other, less playful contexts. Take, for instance, a guild trying to organize one of WoW's "40-man" dungeon runs [4]. To start with, the schedules of 40 individuals (and few more for possible last minute substitutions) will need to be aligned. Necessary potions and materials will need to have been gathered well in advance. Tactics will need to have been discussed and agreed upon, with a division of labor that best exploits each player's gaming experience and the abilities of their character. Interpersonal issues will need to be kept in check (there is an inherent amount of stress and tension in these complex fights) and, should the group

succeed, the powerful "loot" obtained from the "bosses" in the dungeon will need to be allocated fairly (only a few items "drop" during these raids, and not all players will come back with a reward).

The list could go on much longer, but the point is simple: groups in online games apparently face many of the same social, political, and organizational problems that social scientists have studied for century. But unlike groups outside of MMOGs, the digital nature of these social spaces makes them particularly amenable to large-scale, automated data collection and analysis. The research community has taken notice, and many scholars now argue that these games might be "living laboratories" that could be used to either test or refine existing theories, or even come up with new insights into human behavior that would not have been previously visible given the limited scope and availability of "real world" data.

As is often the case with new and exciting research domains, early work took an optimistic view of the potential use of these living laboratories, emphasizing the opportunities they present rather than the potential pitfalls [2]. More recently however, a more critical view has begun to emerge. In particular, Williams [18] questions the extent to which human behaviors observed in virtual spaces occur in the same way they occur in real spaces. This "mapping principle", often taken as a given by virtual worlds researchers, is less obvious than it may seem a-priori and, therefore, it is something that must be established and validated. Williams proceeds to outline a research agenda that would more systematically address this mapping issue, in order to more firmly establish virtual worlds as valid spaces to study human behaviors. In doing so, he lists several factors that could shed light on the existence (or lack thereof) of a virtual-real mapping.

With my colleagues at the Palo Alto Research Center, I have been engaged for several years in intensive data collection in several MMOGs. As our work progressed, we faced many of the questions Williams raises about the validity and generalizability of our findings. In this chapter, I want to draw on our experience collecting and analyzing behavioral data in online games to start addressing at least some of these questions. In particular, I will argue that assuming the existence of a direct mapping between online games and more familiar "real world" spaces might be overly optimistic in some cases, but perhaps less than one might initially think. More importantly I will argue that wherever the mapping breaks down, it should also be possible to explain why and to subsequently factor out the confounding factors, which makes using online games as experimental sites a valid proposition provided it is done carefully. My arguments will be based on the data we collected, in an attempt to ground the debate rather than arguing about the merits of these environments as a research platform in the abstract.

Because of this empirical grounding, I do not claim to cover the "mapping principle" exhaustively but instead focus on three problem areas that were apparent in our data sets: the impact of "game variables" on observed behaviors, the issue of skewed or transformed personalities and user backgrounds in online games, and finally the lack of a clear boundary defining the "game space" exactly and delineating where observations should start and stop. I begin below by addressing the important issue of the distinction

between online games and virtual worlds at large and the impact of game design variables on behavioral observations.

A game is a game by any other name
Before making any argument about the research value of a data collection site, it is important to define its scope and limitations. However, the recent explosion in the number and popularity of graphical online social spaces has often lead to a tendency to lump a wide variety of environments under the banner of "virtual worlds." While these environments share some high-level attributes (e.g. a 3D or pseudo-3D world, avatars representing the user, some form of user-to-user communication channel, be it text or voice, etc.), they are obviously designed to support very different activities. Designers of virtual worlds literally encode support for these activities in the software used to generate and maintain the environment, which greatly facilitates some behaviors and hinders others (a principle Lessig [12] famously described as "code is law").

For instance, I have described earlier how the design of quests in MMOGs progressively and almost inexorably steers players toward group activities. To be sure, players can still engage in solitary activities when they reach the "endgame" (the last level available) [9], but the "laws" of the game embedded in its design will make this increasingly less rewarding, up to the point where continuing to play alone might make little sense. Another example is the concept of "character classes" that is nearly omnipresent in MMOGs: when creating a character, players will have to select a class (e.g. warrior, mage, priest…) that gives them a functional specialization in the game world (warriors are good melee fighters but cannot cast spells, priests are good healers but must be protected by others, etc.). This creates natural interdependencies between the players and encourages the formation of balanced groups where each class is represented but once a class is chosen, players usually have little room to improvise (try as you might, you will never really be able to heal someone with a mage in WoW).

I want to make clear that I am concerned here exclusively with such online games, rather than virtual worlds as a whole. Narrowing our scope is a necessary first step in analyzing concretely and critically what can be accomplished in digital spaces – researchers familiar with different environments, say, Second Life, would have to deal with a different set of "laws" encoded in the virtual world's software and would presumably discuss a different set of constraints that the ones I will be presenting below. What is important however is to recognize that the technical and social architectures of an online environment are inter-related and, therefore, that the nature of this relationship needs to be made explicit before attempting any kind of comparison between behaviors in digital and physical spaces.

In our case, the "laws" enforced by an online game's software present researchers with a conundrum. On the one hand, it seems that designs like the stereotypical MMOG I described will narrow down the range of behaviors in the world to a more manageable subset, thereby facilitating observation and analysis. On the other hand, the software tools used to steer player behavior might have more impact than the fundamental traits

researchers are trying to observe, introducing confounding factors that have to be taken into account. I will illustrate this tension with a concrete example.

It has long been hypothesized that the structure of an organization plays a role in its eventual survival. Certain organizational forms (organic, hierarchical, etc.) are better suited to certain tasks and environments, and should be directly linked to a group's eventual performance. An online game would seem to offer a perfect environment to test this hypothesis on a large scale: across servers, hundreds of groups (guilds) all strive to accomplish the same objectives (defeat increasingly difficult "bosses" in high-end dungeons) under the same constraints (the "laws" enforced by the game design).

To exploit this opportunity, we mapped the social networks of hundreds of guilds in WoW and tried to assess the existence of a link between social network variables and the eventual survival of guilds [10]. My point here is not to restate these results one more time, but rather to point out an important outcome of our models that we only briefly touched on in the original paper: while we can see the effect of a group's structure on its eventual survival in WoW, two of the three most significant predictors of this survival are based on "game laws", that is, constraints hard-coded in the game's software. In fact, the most significant predictor of group survival in WoW is the balance between classes in the guild – a constraint built into the game's architecture that players have little control over, save for their initial choice of what class to play (see above). The overwhelming influence of such game variables (class balance has twice the effect of the first structural variable in the model, subgraph size) shows that, while online games can be used to model some behavioral phenomena, the range of behaviors observed might be constrained by factors having little parallels in the "real" world. To be sure, the influence of these game factors remains an interesting phenomena in itself: for instance, one could think about what kind of other interdependencies could be built between the players to foster cooperation without depending on class mechanics. But their influence also suggests that online games might not be the best environment for "normal science", that is, proving or extending existing theories based on observations in the physical world, since the software's architecture seems to introduce constraints and concepts that have no direct equivalent in the space where the theories initially originated.

If the mapping from the virtual to the physical environment is less direct than researchers might like, it is equally interesting to note that the reverse is also true. While online games face many of the same issues as other societies, by the same token they also develop their own culture, which may operate under norms quite different from those seen elsewhere. Again, I will illustrate this point with a concrete example from another study, this time of the MMOG Star Wars Galaxies (SWG).

SWG's designers (and foremost among them Raph Koster) tried to break away from some of the most formulaic aspects of MMOGs in several ways. In particular, based on principles he had articulated earlier in his Laws on Online Worlds Design [11], Koster made a deliberate attempt to import concepts from urban sociology and architecture into online games. This translated into a strategic use of space and timing to steer players to specific game locations, where they would have to congregate and mingle for a while

before moving on to other activities. From this sociability was supposed to emerge more organically, as opposed to the more formal and constraining mechanisms implemented in other games (e.g. quest groups). An example was the cantina present in each major city in the game world, which was intended to function as a kind of "third place" [14] analogous to a local pub. One character class (the Entertainers) had to congregate in the cantinas to offer their services: healing the "mind wounds" of other characters, which prevented them from functioning at peak performance. Other character classes would visit the cantina, "watch" an Entertainer (by clicking on them) and, provided they stayed long enough (about 5 minutes), their wounds would be healed and they would be able to continue playing. During this "forced downtime" players would have the opportunity to chat and get to know each other, presumably leading in some cases to the formation of longer-lasting social bonds.

At first sight, this seems like a fairly straightforward transfer of design principles from the physical world to the virtual. Our observations of player-to-player interactions in SWG's cantinas, however, revealed that principles working in the cultural context of our physical society might not survive the transition to the culture of a gaming environment [7]. In particular, players resented being "forced" to wait and interact with other players: watching an Entertainer in the cantina interfered with their more instrumental objective of progressing quickly in the game. In other words, a gaming culture built around achievement and a sense of fast, easy progress clashed with the designer's intent for a more sociable, leisurely experience. As a result, players engaged in what might be seen as a perversion of the game's original design: Entertainers developed macros that would let them heal "mind wounds" on auto-pilot while they were away from the keyboard, automatically generating experience points but preventing any social interaction with the visiting customers. In turn, these visitors came to cantinas as infrequently as possible, stayed just long enough to get their character back in working order, and quickly got on their way to the more important objectives they had to accomplish.

SWG is but one illustration of the dangers of drawing too many direct parallels between online games and other environments. While there are undoubtedly some similarities, it is important to recognize that game worlds develop their own culture and norms of interaction, and these will affect the kind of observations researchers can make. My point here is not to say that online games have no value as experimental sites but rather to caution that they have their own set of constraints, many of them built into the environment's software as we saw earlier, others emerging over time as a unique culture develops among the players. These constraints must either be factored out of observations and models if any generalization to the physical world is to be achieved, or VWs must simply be analyzed in themselves, as phenomena that are intrinsically interesting without necessarily trying to establish direct links to pre-existing, non-virtual environments.

Life on the screen: who is really playing?
The issues of identity and the presentation of self online have been important to computer-mediated communication (CMC) scholars for decades. The title for this section is borrowed from one of the most influential early works on this topic, Turkle's Life on

the Screen [17], in which she argued that in "computer-mediated worlds, the self is multiple, fluid, and constituted in interaction with machine connections" (p.14) and that "online switches among personae seem quite natural" (p.256). This perception of online worlds as ideal environments for identity exploration persists to this day, and was naturally extended to virtual worlds. For instance, Castronova [3] argues that virtual worlds "give you a freedom that no one has on Earth: the freedom to be whomever you want to be."

This seems to pose a fundamental problem for research in online games (and virtual worlds more generally). Any study of human behaviors and interactions must account for the background of those involved, if only because social, psychological, and demographic categories may predict a large portion of the outcomes [18]. But if we assume that users have at least two identities, one for the real world and one (or more) for the virtual world, the necessary mapping between online and offline selves breaks down, which puts into question the validity of extending findings from observations in the digital realm into the physical one – after all, one could always say that players are not "really themselves" online. In some sense this reinforces the cultural issue I mentioned earlier: just as online and offline cultures may differ enough to prevent sweeping generalizations, so might differences between online and offline personalities.

Here however, it is generally accepted that congruence between online and offline personae can simply be measured: in [1] for instance, Bessiere et al. found that WoW players tended to be more conscientious, extraverted, and less neurotic than they were offline. While this may at first seem to reinforce the notion that online and offline selves differ, it is important to note that these differences were quite small. And moreover if these differences can be reliably assessed, then they can be taken into account when analyzing some of the behaviors observed online (e.g., an increase in sociability in virtual worlds could be traced back to the more extraverted personality of virtual world users when they are "in avatar", which is itself reminiscent of early CMC research on the polarizing effects of electronic communication media [15]). Just as "game variables" (see previous section), psychological traits can and probably should be explicitly defined and factored out of any analysis seeking to draw parallels between behaviors observed in online games and those in other contexts. In this regard, the work of Yee [e.g. 21] is particularly relevant.

Moreover, it is also important to note that dichotomous views have been recently replaced with a more nuanced understandings of the "synthetic" personalities [13] developed at the intersection between online and offline spaces. In fact it seems more and more probable that as online games and virtual worlds become more widely used, the joint effects of broadening the users' demographics and an increase in their experience with these spaces will make psychological differences small enough to be irrelevant. In an extension of [1] based on identical methods, but expanded to a broader population of users spread across three different virtual worlds, we were able to show that differences between online and offline selves tend to disappear over time: as players spend more and more time in their world(s) of choice, they online and offline personalities converge to the point of being indistinguishable [8]. Therefore, as an increasingly large number of

Internet users spend more and more time in various virtual worlds, there is reason to believe that researchers will be able to observe genuine behaviors tied to an individual's basic psychological traits, as opposed to wild identity experiments that would never have taken place in the physical world.

If the "personality transformation" that supposedly occurs when users log into online games is less of an issue that we might initially have thought, how about other background variables? Research on online games is often dismissed as irrelevant because the user population is supposedly skewed towards young, affluent Western males who have the necessary time, resources, and inclination to inhabit these online spaces. Any observation made online would therefore not generalize to a wide cross-section of a "normal" real-world society. And while it is feasible to assess online and offline personality differences using fairly simple and well-tested questionnaires (see above), obtaining reliable socio-demographic data from the players in non-intrusive ways is much more difficult. In most online games, there seems to be little connection between a player's character and their real world age, income, gender, etc. (see again [8]). Of course, one could always ask the players directly in the game, but this gives rise to the possibility of deception with few means of reliably crosschecking the answers. In the end, game companies hold the key to this data, since their servers can map between online characters and their user's account, the latter containing information such as a user's real name, address, etc., which can all be tied back to socio-demographic variables of interest.

Until recently, game companies had been surprisingly reluctant to collaborate with researchers in exploring this issue. This is probably based on a legitimate fear of their competition: account data is a precious business asset that reveals a lot about a company's strengths and weaknesses, and it could presumably be exploited by others to gain a competitive advantage if it were leaked out. The recent decision by Sony Online Entertainment (SOE) to share server-side data with a large team of social scientists [19] is therefore to be applauded and, hopefully, the researchers' careful management of this data will encourage other companies to follow in the same footsteps. More importantly perhaps, results from this research project showed clearly that the "gamer stereotype" does not hold. To cite but one example, older players and women played more than others, a complete opposite to public perception of gaming usage patterns. Studies such as these demonstrate that the user population in online games is much more diverse than initially thought, which reinforces their validity as an experimental environment. To be sure, there are differences and the reasons behind these differences need to be explained. But a careful characterization of the gaming population's socio-demographic data such as [19] should enable researchers to explicitly acknowledge these differences and, again, factor them out if necessary.

Ill-defined spaces: taking an ecological view of the (virtual) world
I have argued in the previous two sections that cultural, psychological, and socio-demographic factors influence the mapping between online games and real-world phenomena to varying degrees, but also that these effects could potentially be factored out provided they are first properly defined and understood – or even that these effects

could simply disappear over time. Another obstacle remains, however: the question of whether online games capture the totality of the user's experience that researchers are interested in or not.

The terminology used when characterizing online games as "virtual worlds" illustrates a common conceptual problem. "World" is often used to signify the sum of human experience and history, or the human condition in general[1]. "Virtual world" would therefore seem to imply that such spaces cover the totality of a user's social experience online, but it is of course far from the truth – especially with online games.

Indeed, activities in online games spill out of their 3D fantasy world into countless websites, forums, social networking sites, video sharing services, etc. Consider these few examples from WoW:

- On ElitistJerks.com, thousands of WoW players literally dissect the mechanics of the game to optimize the performance of their character during complex group activities. Participation on this site implies a desire to understand the more computational aspects of WoW, and a tendency to favor an "instrumental" play style concerned with efficiency. Some users even emerge as resident experts on a given character class. There is, however, no indication in the game that a player is involved on this site.
- On Thottbot.com, another thousands of users share data about quests that they collect during gaming sessions using software "addons." The site also supports lively discussion about these quests and how best to accomplish them. Players in WoW are often asked to "go look it up on Thottbot" when asking for help in the general chat channel, a suggestion that would make little sense without knowing about the existence of this knowledge database and might convey the (misguided) impression that players are generally unwilling to help each other, while in fact help is readily available outside the game's boundaries.
- On YouTube.com, countless videos captured in the game world offer a source of game knowledge (e.g. demonstrations of how to successfully defeat a given boss) or entertainment (there is even a WoW soap-opera, see http://www.youtube.com/user/watchtheguild, with more than 62,000 subscribers). Yet the production and producers of this video content are almost totally invisible in the game world.

The list could go on for literally pages after pages: quite clearly, game-related activities are not limited to those taking place "in-avatar." As such, taking into account only data collected in the game world itself gives a partial account at best of the players' behaviors. This is particularly problematic when trying to characterize the role that individuals play in their community. In earlier research I conducted on Open-Source Software projects for instance, using an ecological and longitudinal view combining data from both the projects' mailing-lists and code repositories revealed that some users who might have looked only peripherally involved based on their code contribution were in fact "retired experts" who contributed infrequently, but decisively, to discussions about the project's

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[1] http://en.wikipedia.org/wiki/World

future [6]. So far however, no research project has tried to combine data from several online sources to characterize behaviors in online games – studies either focus on the game itself, or on one (or several) of these "external" resources exclusively. Note that my own work on WoW is subject to the same criticism, but I believe that this obstacle is not insurmountable and that it might even be construed as an opportunity. I intend to combine our in-game data with other sources in the near future, and I would argue that taking such an ecological view is a logical next step for the online gaming research community if any argument about the mapping between online and offline behaviors is to be made.

Conclusion

Based on practical experience with collecting and analyzing behavioral data in MMOGs, I have proposed in this chapter that, in three areas at least, the question of a mapping between "real world" behaviors and those observed in online games is both a source of research opportunities and some significant pitfalls that need to be avoided. While online games are significantly different from more traditional, offline environments, there are still ways to draw interesting parallels between the two provided one carefully considers the diverse factors contributing to the observed behaviors.

The increasing convergence between online and offline identities is one reason to be optimistic about the use of online games (and virtual worlds more generally) as a source of valid, generalizable behavioral data. Early CMC research emphasized the transformative potential of electronic media, reinforcing the perception that users might not really be themselves online. While this might very well have been true in the early days of the Internet, it is important to recognize that a much larger segment of the population now spends a significant part of its life online. Virtual worlds and online games are not exotic environments dedicated to the "identity play" of a few, but instead spaces that users move in and out fluidly, which in turn leads to the construction of a "synthetic" identity that remains fairly stable online and off. And even if differences remain, it seems possible to use standard psychological assessment tools to factor them out.

Still, online games are not just carbon copies of the real world: they are societies in their own right, capable of evolving their own norms and cultures. Some (but not all) of this indigenous culture will be influenced by the way the software is architected, which permits certain actions and prevents others. When using online worlds to understand human behavior, it is important to define and isolate these "game laws" as much as possible if any generalizability is to be achieved. But of course, one could also simply consider these worlds to be interesting "sui generis", and simply study them as full-fledged social worlds in their own right, without immediately attempting any parallel with offline environments. This, to me at least, sounds like the most fruitful approach in the near term. In fact, rather than always searching for a link between physical and digital spaces, it might be more productive at first to consider the entire ecology of digital spaces that form an extended "online game world" to understand the totality of experience in these environments. Once their defining characteristics are well understood, it is then

reasonable to assume that differences between them and other environments can be explicitly isolated and possibly factored out if and when needed.

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