Getting Real About Games: Using Ethnography to Give Direction to Big Data

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ABSTRACT
HCI scholars have been among those attracted to the study of online, computer-supported gaming. "Big Data" approaches, which analyze electronic traces left by game play, are an increasingly popular way to study it. This paper identifies basic epistemological problems in some such approaches, focusing on those that implicitly depend on the assumption that game play is fundamentally the same as other social activity. The paper explains why this and related assumptions are questionable, and why these Big Data approaches cannot establish their validity on their own. The paper then reports some results of a preliminary ethnographic study of Massive Multiplayer Online Games (MMOGs), in order to illustrate a way that ethnography can provide an initial purchase on how the underlying similarity/dissimilarity issue can be studied. It concludes by explaining how methodological triangulation, involving a dialectical discourse between ethnography, on the one hand, and Big Data and similar approaches, on the other, may be able to place Game Studies on a firmer epistemological foundation. It is the attempt to achieve such significant objectives, in particular to justify a foundational critique of a major new development in Game Studies, and to do so in a single paper, that justify inclusion of the paper in alt.chi.

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Human Factors; Design; Measurement; Theory.

INTRODUCTION
The study of online games has given HCI and other scholars a rich source of ideas about how humans interact with computers. ((For a general survey of HCI and HCI-relevant studies of games, see [e.g. 4, 5, 6, 7, 8, 10, 11, 12, 13, 15, 16, 17, 21, 29, 32, 33, 34, 37, 38, 39, 40, 41, 42, 43]) Among the reasons that can be used to justify such studies are:

1. To understand ways that interactions while gaming can be improved, in order to make better games [e.g. 13, 15, 16, 17, 30, 42, 43];
2. To discern ways that pleasurable aspects of game play can be leveraged to other arenas; e.g., using games to educate people/impart more knowledge (e.g., "serious games" [e.g. 10, 11, 30]);
3. To use the commentaries and even meta-commentaries on the dynamics of normal life that gaming offers to draw more general design inspiration (e.g. [1, 2, 3, 4, 5, 8, 21, 29, 32, 38, 39, 40, 41]); and
4. To understand play in virtual worlds/look into player behavior because better understanding of player social behavior will have some broader, more general benefit for HCI and related fields (e.g., [6, 10, 12, 15, 17, 22, 26, 27, 31, 34, 37, 39, 40, 43)

This final reason is the one that is central to the concerns of this paper. We focus here on some broader implications of studying game social behavior in order to raise a general issue about what it tends to presume. Our basic questions are, "Why in general should we study games and gaming? Is it because such behavior is reflective of general human behavior, or is gaming behavior uniquely important precisely because of how it *differs* from other behavior?"

We believe that a return to such basic questions is made necessary by the recent prominence among digital technology researchers of a particular kind of "Big

Data"/"Data Science" approach to study of digital technology-mediated behavior. When applied to gaming, the Big Data approach typically focuses opportunistically on the traces left by players in games' virtual worlds, such as avatar action data and chat logs. (Such traces, gathered normally by software during game play, have been available to scholars to varying degrees and under diverse auspices, but these problems are not our focus here.) By placing these data *en masse* into a database, the traces are reframed as player action data points that can be manipulated quantitatively.

Even these

Big Data approaches to the general dynamics of gaming are held to be desirable for several reasons. One is because they afford a numerical (and therefore more "scientific") approach to the study of human behavior. Additionally, it is believed that, because of the character of virtual worlds' design, all players' actions are recorded in at least some form, so the database can be seen to yield an inclusive, more or less complete record of activity. Consequently, some major problems of sampling (but by no means all) are believed to be obviated. In sum, Big Data analyses of traces from virtual worlds make for an easy, complete, and quantitative approach to the understanding of social phenomena [24].

There are many forms of Big Data research on games, but a few scholars [35, 42] have begun to raise questions about the epistemological presumptions that inform some of them. For example, databases may be simply trawled for statistically significant correlations (one form of "data mining") among the traces-turned-into-variables, and yet some of the correlations are then treated as providing general explanations for social behavior. Such practices may raise several issues, including a) exactly how one is to separate valid correlations from, e.g., those that are artifacts of database construction; that is, how such separations are epistemologically justified; b) whether these *post hoc* explanations of correlations are different from the 19th Century rank empiricism rejected by science long ago; and c) the dangers of confusing a correlation for a causation. Even more basically, using game data in these Big Data ways involves an additional questionable assumption. To use game studies to make inferences regarding general behavior in the real world, behavior in games must be representative of behavior in the non-game, "real" world.

However, gaming behavior may instead be primarily a function of the social form in which it is recorded or framed (that is, a derivative "Hawthorne" effect). To assume that game behavior simply reflects general behavior is suspect on its face, because what makes a game a game is precisely that is *different* from the real world. This is the essence of "ludism," the interpretative perspective dominant in the general study of games [10, 21, 25, 33, 39] That is, we know we are in a ludic world because the rules governing behavior are explicitly different from those of normal life, the "not gaming," that is the rest of human activity. Since the distinctive feature of games is their difference from the real world, simple or direct inference from game life to real life is not justified.

Of course, inference from game behavior is less problematic if our primary interest is in, say, improving game experience, as in the first reason for studying games that we discussed above. In contrast, and this is our primary contribution to games studies in HCI, the value of using an understanding of game play dynamics to illuminate general human behavior must be established; it cannot be assumed. Nor can any amount of "Big Data" analyses of corpora of online behavioral traces be used on their own to address this issue. How much one can infer from traces must logically be established *before* and *independently of* their analytic use for this purpose.

We in HCI need a much more exact understanding of the specific nature of the game/real life relationship before knowledge gained from Game Studies can to be presumed to illuminate social behavior in general. (A similar point is valid with regard to using Big Data analyses of game play for, say, user experience design inspiration; but this use is not our focus in this paper.) Establishing how much gaming parallels living is no simple matter, as we need to find some other way to establish more precisely just how much game activity deviates from "normal" activity.

In contrast to the brute Big Data approach we have focused on thus far, one combined with ethnography *could* provide substantial help in studying the extent to which game behavior is different from/similar to real world behavior. Establishing this is our second contribution to the HCI-relevant literature on gaming. Of course, ethnography as a means of examining behavior in virtual worlds is not new to HCI. Our third, more particular contribution is to illustrate how, through a preliminary ethnography of massive, multi-player online games/gaming (MMPOGs), we were able to develop a procedure that moves us substantially closer to being able to answer the "Why study games?" question. This research experience led us to argue that ethnography can be of more general help to HCI scholars in differentiating out aspects of game behavior that follow from fictional, virtual worlds, like those depending on the characteristics of the game's physics engine or deliberate design decisions by the game's creators. At the same time, it helps us to identify game activity that *is* like that in real life, such as actions that carry notions about real life over into a game's virtual world.

Our final, ultimate contribution is to show how it should be possible to combine initial ethnography, like what we illustrate here, with other approaches, whether interpretive coding or Big Data. Exploratory ethnography can inform these approaches; that is, provide them with a clearer sense of what to look for: In our case, kinds of electronic traces

that can be connected to irreal and real life, respectively. While ethnography can establish that some game play is like action in real life, and some isn't, it can on its own only with great difficulty establish the relative frequency of each type. Doing this requires analyses of representative corpora of game play, but such analyses can be given theoretical direction by preliminary ethnography. In our conclusion, we describe in more detail why we believe that the triangulation of multiple methods in dialogical (and dialectic) interaction offer the best promise of being able to answer the necessarily preliminary question in HCI game studies: Why study games, or, more particularly, to what extent does it make sense to study games in order to infer something about typical human behavior?

RELEVANT RESEARCH

To frame our discussion of the big question of how games relate to the real world, we discuss here some examples of the different ways HCI and HCI-relevant research has approached the study of virtual worlds. The nuanced and emergent nature of interaction in the virtual worlds created by games, especially MMOGs, cries out for scholarly examination, and scholars have responded.

HCI has had an interest in games and the virtual worlds they create for a number of reasons. For example, Ducheneaut and Yee examined what "gaming communities can teach us about the social dynamics of online groups, as well as the potential for creating new tools to help understand and manage these unique online social spaces." [17]. Similarly, Xu et al. investigate social relationships in the context of online FPS games to see "…how players manage these relationships to enjoy their game experience better" [42].

The framings of HCI-relevant "improvement" studies of gaming vary substantially in terms of width. Some examinations look at games exclusively as gaming alone. These have included making games more usable for different levels of players [13]. They also seek to find ways to make games more enjoyable both in terms of social interactions: "sociability may imply for the design of game mechanisms, as well as comparing the forms and impact of social relationships across different game genres." [42]

Other HCI scholars have approached gaming as something like an art for, as containing commentaries on real life. Pace has examined "how racial stereotypes, or preferences for dominant stereotypes, are created and represented in the virtual world avatar creation process." [32]. Still others have looked into topics such as cheating [7] and adoption [11]. Grimes and Feenberg applied critical theory to gaming in an attempt to rationalize play and attempt a "broader understanding of how play practices may themselves come to reproduce the larger processes of rationalization…" and "situate digital games within the larger socio-historical tendency toward rationalization that continues to shape modern play practices." Viewing games as "opportunities for democratic rationalization within all systems of social rationality" rather than merely a "technological divertissement" [21].

Still others have treated gaming more as reflecting rather than commenting on real life. Some of the work of T.L. Taylor has explored such issues as: "notion of assemblage for computer game studies", "complex nature of player-produced culture and its relation to technical game artifacts", "player culture… in tension… with the kinds of controls designers often feel obliged to enact.", and issues of autonomy "need to develop more complex ideas about the life of digital cultural artifacts, collective authorship, and the autonomy of user experience" [38, 39, 40, 41]. Similarly, Grimes and Feenberg question the relation of games to rational social systems in the real world: "how play comes to operate as a source of institutional order, enacting the same principles found within other more commonly recognized rationalizing processes such as technologization, bureaucratization and commodification." [21]

In such ways, interpretations of gaming are generalized outside of games into larger concepts, finding, for example, what implications social interactions in games have for online sociability [7], or even, general interaction: "As interaction designers, we might ask how the stages, or interactive ecologies, we create regulate or encourage identity performance" [3].

Researchers have long been fascinated with the link between online identity and offline self." [16]. There are also questions regarding the source of interactions: "At the center of it all is the tension between whether intimacy is a phenomenon of the *WoW* world, of the real world, or both" [33]. As Ducheneaut et. al say, "The relationship between online games and "real world" behavior in organizations is clearly an opportunity for future research" [17].

In addition to the different reasons for investigating virtual worlds, HCI has also adopted a number of different methods to investigate games. These have included using surveys and logs to build up a "census of a virtual world" artifact analysis to understand the importance of items in games [6], and ethnography [29]. In some investigations, a number of different methods are used together Such multi-disciplined approach opens up a number of different possibilities for ways of approaching virtual worlds. It also can make it difficult when trying to determine which method should be employed in a given situation, and how it should be employed. To expand upon this, we will examine one of the more robust means of examining virtual worlds: ethnography.

Review of current ethnographic approaches

The nuance of social behavior in games has certainly encouraged exercise of the ethnographic imagination (e.g.,

[8, 12, 29, 39, 40]). Before presenting the specific way that we used ethnography to situate the study of social behavior in games, we will examine how that it has already been applied. As above, we do not limit our survey only to explicitly HCI literature, but rather included perspectives from anthropology, game studies, and other related discourses. In creating a fuller map of the applications of ethnography, our aim is not to find a single "right" way of applying ethnography, but rather to illustrate how it can be used to foster better understandings of the ways that game play relates to real life behavior.

Interestingly, the reasons for doing ethnography of gaming parallel those given for the more general studies discussed above. For example, X is concerned to improve game experience, Y explores serious games ethnographically, and Z looks for design inspiration.

Moreover, like Big Data study of MMPOGs, the ethnography of online game activity is not without its problematic aspects. For example, as "professional outsiders" new to the worlds they are observing, game ethnographers may fail to capture how more experienced players actively co-constructors the game world, as in the World of Warcraft (WoW) play analyzed below. This problem is particularly relevant to our concern in this paper, to specify how much of what all players—neophyte "newbies" and experienced—actually do when playing reflects real life. Moreover, as Boellstorff observes, "too often, virtual worlds are described in terms of breathless futurism and capitalist hype" [8]. We believe that research on games is especially prone to fall victim to hype when care is not taken to specification of just why gaming is being studied. When such care is not present, analysts are prone implicitly to take aiding game designers as the point of such research: E.g., Ducheneaut et al. describe avatars as being a "visual representation of the user, a 'tangible' embodiment of their identity" [16]. The avatar may indeed be in some sense a representation of the player, but at what level of fidelity to what the player is like are such representation constructed?

Or consider the contrasting problems of Nardi's "hyper-play" description of video games as "uniquely digitizing rules of play, encoding them in a software artifact" [29]. The notion "play," specifically, heavily frames Game Studies, presenting video games, for example, as not life but a recreational foil for, even the diametric opposite of, the substance of it. Again, rather than *assuming* that games must necessarily be approached "strongly ludically," it is important to establish first how much and which significant aspects of activity in game play is/are actually carried over, albeit perhaps unconsciously, from the player's, and collectively the society's, real social behaviors. If substantial, they justify "weak ludism" instead. This issue has been addressed by [10] regarding the design of new MMOGs, but we think it is equally relevant to the study of currently existing games.

Indeed, the basic ambiguity regarding fundamental objectives lurking within exiting general study of online games is also evident in some ethnographic studies: Are they to be studied because they are indicative of "normal" human behavior, or are they rather worthy of study because, as suggested by "strong ludism," they are in essence meta-commentaries on "normal" life? Before one can choose which of these basic orientations makes most sense, the degree of underlying similarity of "game" and "life" must be established. Especially if strong Ludism makes more sense, ethnographic approaches to game research may be no more valid than those of art or literary criticism.

Indeed, ethnographic approaches to gaming can be seen to have their own special version of the problem of why study games, as reflective of life or as related to life dialectically, as interpretations whose meanings contrast with life? An important strain of ethnographic research, encouraged in particular by Geertz [20], may be modeled more on aesthetic that empirical sources of inspiration; that is, more like art criticism or film review than straightforward description.

One way to understand the different ways in which ethnographers approach gaming—that is, to seen when weak and when strong ludic approaches in ethnographic work on games is justified—is to distinguish between "doing ethnography" and "appropriating the ethnographic gaze" [23]. In the former case, the point of game research would be to understand holistically the world of the gamer —that is, the parameters of that world, including how gamers conceive of what they are doing, as well as, pace Boellstorff , how gaming fits into the rest of their life. To appropriate the ethnographic gaze, in contrast, means to adopt temporarily the pose of the participant observer, in order to make one or more analytic points. Such a posture, for example, is often struck by philosophers as they conceptualize a culture with a specific dynamic in order to clarify their argument. Their habit, on occasion, of identifying some occurrence as a "real example" serves to underline how such philosophically posited anthropologies are not to be confused with empirical ones.

We do not point out how ethnography can be approached in these two ways in order to claim that one is necessarily more important or better than the other, to distinguish between fulsome ethnography and appropriating the ethnographic gaze in order to support the former and "dis" the latter. Indeed, being able to adopt temporarily the position of the field worker is increasingly seen as a necessary skill for HCI professionals. Indeed, each is appropriate in its place. Our point is to argue that full ethnography should be the priority now. This is because of the central issue raised above, that before we can proceed further we need to be able to be much more specific about the relationship of game life to real life, to be able to strike an empirically-grounded balance between inference and commentary, between strong and weak ludism.

Another helpful set of lenses through which to view play ethnographically are the forms of experience [28]. Csikszentmihalyi describes optimal experience as being rooted in the enjoyment gained from the completion of something that is difficult [14]. Viewed experientially, optimizing play means incorporating elements of difficulty. Beyond understanding the rules that have been designed into the game, manipulating these "rules of the game play" is often characteristic of especially expert play. Such manipulation is both a recognition of and a response to, even a commentary on the game's design. Identification of points of such manipulation may indicate ways to improve play; indeed such manipulations can be incorporated into play, but as player "mods" or via explicit changes in the rules.

Such manipulations combine the strongly and the weakly ludic, in that they both recognize the unique rules of the game and counter them, often arguably via imitation of what actually happens in the real world. In addition to rules designed in, actual play also depends on the physics engine that makes up the basic aspects of game "places," as well as players' expectations carried over from reality and the implications derived from them.

Without having teased apart these general influences on MMOG play, the analyst can only strike an ethnographic gaze, provide an "as if," plausible description. To treat these as a basis for inferring things about more general social behavior is highly dubious.

METHOD

Recognizing many of the problems cited above, we carried out a preliminary ethnography of gaming in hopes of laying a firmer basis for game studies, one that would afford additional ethnographic as well as other approaches, including Big Data. Here we describe this study, our main goal being to illustrate how we came to frame events occurring in MMOG play so that they might be might be properly parsed between those like real life and those different from it. (See also [22].)

To get at such dynamics, we first assembled a group of researchers that included experienced players as well as those less familiar with the culture of gamers. We then chose sample of MMOGs as field sites, stratified in terms of age and type. This initial sample was quite large, covering games that were online and offline, single and multiplayer, and three-dimensional and two-dimensional. After identifying several features, our team selected an array of games that we felt would foster a wide variety of different kinds of social interactions, give us

a manageable sub-set of MMOGs, and be large enough to insure that we would be examining many of the moves that take place in virtual worlds. We began with two: *World of Warcraft* and *Argo*, as they appeared to contain contrasting inclinations regarding how factors external to the world of the game affect gameplay. These two games are similar in content (both fantasy Role Playing Games), but different in player base, cost, and level of development.

After some initial attempts to examine entire games, we decided that this approach got in the way of reaching our desired observational depth. ("Total analysis" is in any case precluded by the ever-changing nature of live MMOGs.) As we were using multiple investigators, in addition to determining field sites collectively, we decided that it was also important to develop a shared frame of analysis. Via continuing talk, we arrived at a useful initial unit of analysis: The event. We defined an event as a specific and discrete interaction that occurred between a player and/or players and the virtual world.

FINDINGS

Virtual Physical Space

We began our analytic work by focusing ethnographically on space and spaces in game play We had early on noticed that we were often invoking notions of space when characterizing events in the worlds of our selected games. In MMOGs, three-dimensional notional spaces are constructed which heavily draw metaphorically on what things are like in the real world. These spaces include objects that construct the experience of space by affecting player movement and creating a visual "feel."

Such spaces have been previously addressed by a number of researchers [26, 5, 27, 1]. In terms of space, Aarseth describes *World of Warcraft* as "not a proper world, or even a fictional one, but a 'world' in the theme park or zoo sense, a conglomerate or parkland quilt of connected playgrounds built around a common theme" [1]. The world of *WoW* surely does include such recreational spaces, in which all aspects have been deliberately designed with the intent of manipulating players' actions via, e.g., the virtual environment. However, we doubt that such intentionality is characteristic of all the special phenomena connected to play events. Rather, virtual worlds also include spaces of "mundane creativity, conversation, intimacy…even tedium." [8]. Even when a space in an MMOG guides the player in the manner Aarseth describes, this guidance is at the very least imperfect, requiring some additional mental work by the player and thereby allowing everyday aspects of mundaneness to slip in. These everyday aspects carry over from the real world, either in that space is required to affords designed activities or space to allow their insertion [1]. We also recognized how a space's characteristics were virtual renderings constructed in part by the game's physics engine. This led us to see how space was an aspect of game experience rooted partly in the physics engine, partly in design decisions made deliberately by the game's makers, and partly carried over, often unconsciously from real life. Seeing how these all are combined in specific events was essential to understanding game sociality.

Objects that restrict player movement

In MMOGs, Avatar movement is often affected by objects that are "solid"—that is, when player's avatars collide with them, they prevent it from moving any further. In addition to large objects, such as mountains and massive walls, spaces can also be divided by partitions. In addition to partitioning spaces, invisible barriers can also prevent access to some specific spaces in the game world, especially those that mimic real world spaces but present difficult design challenges. Along with ramps and stairs, there are other invisible barriers at many of the entranceways to buildings. Buildings' interior spaces also have a high potential for collisions. Inactive Non-Player Characters (NPCs) are located near buildings rather than inside. These locations may follow from quest completion, an intuitive time for a "break," or because they appear to be "normal" places to congregate. In all these ways objects are powerful formers of social interaction.

Visual objects that do not restrict movement

In addition to buildings and partitions, other, non-collision elements guide players. These three dimensional objects do not restrict movement like walls or partitions, but they do restrict the players' visual path. This acts as a compromise, reflecting the real world existence of such things without the prohibitively difficult task of faithfully [9] mimicking such interactions via code. While the visual obstructions created by these objects may direct player movement, these two dimensional textures are more commonly used as a method of suggestive guidance, e.g., serving to identify path type. When nearing its destination, a path may change from natural grass or dirt into manufactured cobblestone or tiles.

Way-finding

For objects to define and create space within virtual worlds, they must exert governance over the interactions that occur. It follows, then, that time spent interacting with objects is also governed. The bulk of game space is open, but traversing open space is a considerable time sink in gameplay. Quests require the player travel somewhere, do something, and often return to the original quest giver to collect a reward. Cities, the hubs of social interaction, are often located far from areas containing quests and monsters that yield level appropriate experience. Travelling to a new area grants experience gain but requires time spent travelling. This is one important aspect of way finding.

Players may move their avatar in any direction along the ground, but the player has to have a sense of how to navigate through the open. Race-based visually distinctive environments are one form of assistance, while another is forming game-space is formed by repetitive objects and environmental tiles.. This reuse creates uniformity, but within the game it can obfuscate landmark use. Identifying t*he* path can have increased importance as means of progression within the game. If a player deviates too far from the path, it can be difficult or impossible to return. This underlines the linear nature of the game and how goals need to be completed in a specific order to maintain reasonable progress.

Time Dynamics as a Second Aspect of Games

The paths of play that make up MMOGs involve time as much as space. The length of the path determines not only its visuals but also how long it takes to traverse it. Even in games where the focus is on fighting monsters and other players, the bulk of the time is spent way finding. While each game creates its own, unique sense of time, some common patterns nonetheless still map to the world outside the game.

Shortcutting

Games introduce "paths" as a means of giving players the ability to shorten travel times across open space between important nodes while still allowing freedom to deviate. Meandering from more overt paths, one deviation is called "shortcutting". While there are drawbacks to taking shortcuts in the real world (injury or death), their absence in-game means players can save time using this method, as long as, e.g., one is jumping from points that are not high enough to kill the player's character. Shortcutting's break of immersive realism is at an intersection point for game with real time. Game rewards are tied to travel time, which is a function of distance and speed. Other means to increase speed include modification of the player's character, mounts, and location-specific flights, all of which cost game currency or other resources. Still, being able to achieve the same result in less time is generally advantageous. Once a method of time reduction is found, the social nature of MMOGs mean it quickly spreads and becomes a part of playing the game. Along with "physical" shortcuts like those described above, there are also shortcuts accessible via real world money. Underground trade in game currency (only gained in game through time-consuming processes) may violate game makers' rules, but it still exists. One "free to play" game offers players the ability to spend real currency to buy points that may be redeemed for in-game resources Along with the illicit money trade, there is a more direct way to increase a player avatar's fitness - the outright purchase of an up-leveled and geared character. Moreover, bots exist that will play the game for a player. This means that the real time of the player can be spent doing other things while the bot increases the player's level in game.

Translation of Time into Fitness

The differences in ways to reduce a player's "real world" time mark a basic division in game type. In some, a player's ability to win a fight is tied quite directly to her ability, within each game event, to out-maneuver her rival Thus, her ability to play the game also depends on time spent playing, since how a player performs depends upon her ability to move in game space, which is generally only

improved by playing the game, e.g. moving up levels via experience and equipment gained through engaging in specific fights. In such games, a player "plays the game," whereas in others, a player very often "plays the interface." "Playing the game" means immersion in the characters, contexts, and even in stories of the game one learns by interacting with other players. "Playing the Interface" means focusing on pressing buttons in properly timed sequences, at which one gets better by abstracting from the world within the game. The ability to win the fight depends more on repetition of finite actions than on a more open process of strategic on-the-fly movement through space.

Same time, different version of the same space

Also relevant to time in play is the fact that it can be important to create a new version of an existing space, enclosed sections that are different from the normal, more open environments. These special spaces are described with terms like "dungeons" and "instances," the difference being how time is handled. In a normal dungeon, all players interact in the game's normal flow of space. A new player entering the space will encounter others there already. In contrast, an instance is a dungeon in which a unique space is created each time a player enters it, either alone or in a group. If a group of players enters an instance at one time, they will experience the space as if they were alone. Subsequent individual or groups of player(s) that enter will have the same special experience, without the players who entered earlier. This means that while time continues to flow, players occupy unique versions of the same space, each with their own time flow.

Different versions of the same space co-existing but with different time flow rates create a logical schism between the space/time of the game and the space/time of the real world. This schism is often built in via game mechanics, the so-called physics engine. There are also play events in which the game world diverges from the real world as a result of player intent. Players can jump down, suffering non-lethal fall damage, rather than take the extra time required to use a ramp. Thus, an interesting relationship exists between player behavior and the sense of time within a game, which led us to conceptualize space/time.

Simultaneity of Time and Space

Practices like adopting shortcutting techniques should be recognized as part of a larger aspect of how space and time are related in MMOGs. The rewards in the game vary directly in relation to the number of trips but inversely to the amount of time spent in transit. A shortcut is one aspect of a strategy to increase reward while decreasing loss.

Intersection of Social Aspects with Time and Space

While there are many metrics of success in MMOGs, one important metric is renown. How well known a player is depends particularly on her ability to complete the goals of the game. Just as a player's ability to win any given battle is likely to be directly related to the amount of time spent playing the game, increased time will also probably raise recognition by the community. (This is true even though, as described above, there are ways to increase perceived experience and wealth that do not involve actual, real world time playing the game.) Games can explicitly encourages reputation through rewarding players, as they play, with points and special abilities. Time spent playing also increases the time when a player can interact with other players. This interaction, in turn, can translate into something like what social scientists call [9] "social capital". Raiding in groups often rewards a player with better items, but these items are limited in number. Thus, the same raid group will have to raid the same dungeon repeatedly in order for everyone in the party to get the items they want. In order to travel through an area that is full of particularly high-level monsters, a lower-level "newbie" player may need the assistance of a higher level player to act as a guide. This all leads to creation of "communities" that manifest complex systems of social interaction during efforts to reach goals.

Changes of Space/Time Based on Social Interaction

Over time, an MMOG world may be experienced as "smaller." This may follow from any of a number of factors: An increase in players' ability to travel, a lessening of the amount of experience at lower levels required to advance, added flight paths, shortened duration of flight paths, introduction of flying mounts, etc. Whatever the reason, this "smallerness" is another aspect of the relationship between space/time and social interaction. In such games, social interactions assume increasing importance. Over time, areas of social interaction are kept while the spaces in between them become smaller. While this has the benefit of increasing the points of social interaction, it has the side effect of reducing the value of travelling in space/time. This results in what players have deemed "MUD-flation" - the decreasing value of in-game assets. As the world gets smaller, each player's ability to access resources increases, so the value of individual resources decreases. This is another illustration of how intimately considerations of space and time are tied both to in-game resources and to reputational "capital." A final aspect of game space/time is a specific developmental trajectory of the game. This "grand narrative" trajectory leads to a further separation in the game's social structure. A player who has been playing since the beginning of the game may be quickly trumped by a newer player with more raw power because of money spent or game change. Still, the "founding father" player's longer experience translates into a form of reputational value. In a similar sense, players who circumvent normal methods of advancement in favor of rapid power gain (eg. account buyers, gold buyers) are [17] spurned by players who have gained experience, gold, items, and class mastery through more conventional use of game space/time.

DISCUSSION

These relationships of space and time, and their simultaneous space/time manifestations, are part of the fundamental, low-level structure of virtual worlds. As such, their specific aspects form the social interactions that occur within those worlds. Consider, for example, cooperative action by more established, experienced players (those who have traveled more of the space of the game and spent more time playing) and toward newer players, which is sometimes fostered (with more experienced players helping newer ones) and other times undermined (through the idea of "newbies" and the creation of a hierarchy within the game). Such in-game relationships are related, subtly, to discrete aspects of the space and time created within the virtual world.

That game events are so structured means that analyses of space, time, and space/time can provide a starting point for comparative "grounded theory" of gaming.

Such a frame is not only valuable for the analysis of virtual worlds in video games; we think it necessary to carry out the analysis of degrees of similarity between gaming and life. By virtue of their analogous relationship to the real world, it is difficult to imagine any virtual world that does not manifest aspects of space and time. Even the most abstract examples, such as the active area of interaction in puzzle games, can still be explicated in this way. In the case of MMOGs, to ignore how space is formed increases the chances of misinterpreting the social interactions that gaming facilitates. Even things not allowed are artifacts of intentional design decisions; thus, any characteristic of interaction is likely to be related to such decisions. The social interactions that occur follow from physics engine, from how players relate to the game's designers' decisions, and from how these intersect with ideas of social interaction carried over by players from in the real world.

Taken collectively, contextual space, time, and space/time illustrate the holistic nature of game play, one reason they are susceptible to ethnographic analyses. Identifying and analyzing these foundational elements allows one to understand large chunks of the game's social activities. Not only do such analytic actions afford richer and more nuanced understandings of how social interactions in games relate to interactions in the real world.

At the same time, one can often distinguish among the physics engine, design, and carryover aspects of specific events in game play. The behavior of shortcutting, for example, makes time loom larger in the game, but it does so in a specific way. While necessitated travelling and the size of the constituted game world are largely functions of design decisions, the players' practice of reducing the time spent playing the game is an element that is best understood as something taken from similar events in real life. In this way, the game-defined elements (strong ludic) and the players' innovations (weak ludic) work together to construct the specific events as well as the overall culture of the game

Practices like these, in which game-sourced and life-sourced elements are integrated, are manifest in many skilled players' normal practices.. That this is the case can' we believe, serve as an important, even necessary starting points for further investigations That is, while integrated in practice, these elements can be separated analytically. If such distinctions could be made in regard to specific events; and further, if the number and typical frequency occurrence of event types could be ascertained; it might be possible to say something more definitive about our main concern. This can now be phrased as the extent to which events in gameplay are similar to or are different from those in real life.

While we think ethnography can provide us with examples of particular events that can be parsed in this manner, and maybe even a typology of events, it is not very good at establishing events' relative frequency, let alone the frequency of, say, events in which game-sourced strong ludism was more important to their dynamics than were life-sourced weak ludism. It may, however, be possible to carry out such analyses of game events "by hand" in enough cases to allow some inference.

In addition, the digital records created during game play offer the possibility of analyzing automatically large amounts of data. Now that ethnography has helped us establish what to look for, the question becomes, are there traces in automatically generated gaming data that can be linked to physics engine and game design, on the one hand, and carryover from the real world on the other? Were this the case, a "Big Data" approach to game analysis certainly could be useful for the behavioral analyst. Indeed, the ideal kind of analysis would be the one in which ethnography, hand coding, and Big Data are brought into collaboration when big questions, like "Why study games?" are at issue.

Such a collaboration, described as methodological triangulation in the social science literature, is what we would hope for in the long run. In contrast, much current Big Data analyses proceed without grounding analysis contextually in the specific game play and culture. Instead, a "data mining" approach means the process of parsing the data is compromised, becoming possibly even the analytic equivalent of "throwing data at the wall until it sticks." This approach could confuse interpretation of particular findings. In this approach, activity that is actually a reaction to the designed nature of the game, or to the characteristics of its physics engine, is impossible to separate from that which a player brings to the game from outside, and thus it is also impossible to use such analyses to establish the extent to which strong and weak [ludism are justified.

CONCLUSION

Unlike Big Data, we began our analysis ethnographically, by listening to skilled players and the language they used to talk about play. This led us to seeing the nature of space,

time, and space/time as important aspects of social interaction in game play. Such grounded analyses afforded useful hypothesis creation. In future work, we hope to combine out ethnography with other approaches, including "big Data," to give the study of gaming on a sounder foundation. That is, while identifying the locations of players throughout a particular episode of play is likely to be suggestive of the areas of congregation and the paths that players take through the virtual world, additional aspects of interaction, such as what is done while at those locations and while traversing those paths, are also likely to be meaningful. How precisely to use these analyses when approaching the large data sets of game play traces typically used in "Big Data" analyses should in our view be next on the agenda for such approaches. However we come to execute this next stage, we are confident that aspects of space, time, and space/time will be relevant to in-game social interactions and thus to more robust understandings of game play.

With regard to ethnography, we identified a particular conception of "space"—e.g., in terms of virtual objects, geographic elements, and other aspects of the "idea" of space—as framing fundamentally how humans interact when playing these games. As we explored ways to talk about space, "time" emerged as an equally necessary analytic category, a prime medium within which spatial interactions take place. Third, we recognized the tight coupling of these two dimensions of interaction—i.e., that play/social interaction takes place in particular forms of "space/time." Fourth, through analyses of MMOGing in terms of space, time, and space/time across platforms, the team came to recognize both the possibility of and the necessity to differentiate among various aspects of these three factors. In particular, we came to believe that it would be possible to account discursively for the manifestations of space, time, and space/time in terms of various combinations of the following factors:

1. The specific characteristics of the "physics engine" deployed by the game by which play is visualized;
2. The deliberate choices made by game designers to encourage or ban particular actions; and
3. The presumptions about space, time, and space/time carried over by players from their "real world" experience— that is, the elements of cultural "pre-consciousness(es)" necessarily, habitually, frequently, or occasionally manifest in game play.

The remaining parts of this paper were devoted mostly to a description of the discussions about MMOG play that led us to articulate these as the grounded analytic notions that we found most useful. In general, we contend that such ethnographic framings provide starting points for theoretically informed hypothesis formation, to replace the simplistic empiricism that is underlies so much "data mining." In contrast, ethnographically grounded analytic framings can provide a way to frame hypotheses about the similarities and differences between computer-mediated and non-computer mediated sociality. Indeed, it should be possible to synthesize ever more satisfactory analyses via reciprocal movement between the various ethnographies of MMOGs and efforts at analyzing Big Data from gaming. In our view, such an analytic practice provides the best hope for constructing a viable theory of the relationship between computing and change in things like sociality.

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