

5. Studying games from the viewpoint of information

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How do players find out what they need to know in order to succeed at the tasks set before them, like defeating a friend in a game of *Starcraft II* (Blizzard Entertainment, 2010) or recruiting competent guild members? How is gameplay behavior and player experience impacted by player interaction with online discussion boards, wikis, in-game chat channels, and gaming friends? In this chapter, our aim is to show how methods and modes of interpretation associated with the notion of *information* can facilitate game research and help answer inquiries like the ones above—and many others. As this chapter shows, several information processes are required for functional, enjoyable gameplay, and they are therefore of interest also to researchers who do not typically analyze information phenomena. Before we proceed to discuss the tools and perspectives implicated in the information-centric study of games, there are however two questions that need to be discussed: what is information, and why is it interesting to consider in relation to game research?

What is information, and why is it of interest in game research?

Information lacks a singular definition. It is a term of broad use in everyday discourse and an important concept in many scholarly disciplines, including the authors' primary discipline of library and information science (LIS). In LIS, information is commonly used to denote potentially meaningful contents that may induce change in our state of knowledge. The process of becoming informed is often construed as complex interactions between the contents' original location (newspaper articles, colleagues, databases), its mode of communication (reading, talking), and the preconfigurations of its origin and destination (skills, preconceptions, functions). Information is thus in close association with terms like meaning, content, knowledge, and communication. Additionally, information is also something related to media, practices, cognition, as well as culture and other contextual phenomena. Key readings on the genealogy, definition, and critique of the concept of information include Buckland (1991) and Day (2001).

As to the question of why it is interesting to bring together the phenomena of games and information, it will be answered—by the means of demonstration—in the main part of this chapter. The chapter consists of a three-section exploration of how the notion of information can be used as an analytic point of entry into the study of games, players, and gameplay. Each section represents different, but interconnected, research perspectives. The first section takes a closer look at recorded player-generated information and online gaming communities. The second section considers game-related information

practices and meaning-making. Finally, the third section analyzes games and gameplay using the perspective of information systems.

Archival inquiries: studying artifacts of recorded information, practices, and information infrastructures

This section aims to benefit game research by showing how document-focused research (e.g., Brown and Duguid, 1996; Berg and Bowker, 1997; Frohmann, 2004; 2009) and trace ethnography (Geiger and Ribes, 2010; 2011) can be used to perform ‘archival inquiries’ of player-generated artifacts of recorded information in context with communities of massive multiplayer online role-playing games (MMORPGs).

ONLINE GAMING COMMUNITIES AND NEW MEDIA

Rehn (2001) characterizes the online warez community in focus of his ethnography by one of its most ubiquitous activities: to discuss and chit-chat, using www and IRC services to communicate. Rehn analyses online small talk not solely as a common activity among the members of the community, but also as a key practice in which community life itself (knowledge, norms, rules, morals, ethics) is reproduced and negotiated (2001). Similar observations of the importance of technologically mediated discussions abound in studies of online gaming communities. For example, Pearce (2009, p.137) argues that the online game worlds are but one, albeit important, part of a larger ludisphere which include all related play spaces online.

As for instance Boellstorff (2008) notes, blogs, discussion boards, and websites are often main sites of interaction in communities relating to virtual worlds. However, there is little research seeking to understand the dynamics between the practices of online gaming communities and the material constitution of their new media environments despite the fact that these are a fundamental part in the communities’ communicative infrastructure. How, then, can this crucial relationship between technology and practice in online gaming communities be conceptualized from the viewpoint of information studies? To frame online discussion boards, blogs, and other game-related new media services as the archives of online gaming communities puts into the center of analysis essential aspects of both the material constitution of said sites, and the way in which they are employed.

ARTIFACTS OF RECORDED INFORMATION AND THE ARCHIVE

An important insight in humanities and social science scholarship is that every social formation exists in communion with its archive. This viewpoint, articulated by among others Foucault (1982), Featherstone (2000), and Cook (2012) serves to accentuate two notable and interconnected points. First, artifacts of recorded information like clay tablets, medical journals, and legal documents simultaneously record and play a part in the social formation within which they exist. The archive is a site whose associated processes of storage, organization, retrieval, and use of artifacts of recorded information, tie into productive power relations and other important aspects of sociocultural life (Cook, 2001). Second, the information infrastructure where the artifacts are stored and accessed—the archive, both concretely and metaphorically—is a quintessential place of study for the researcher seeking to gain insight into the social formation in question.

In gaming communities, it can be argued that the function of the archive is filled by the communities' related new media services such as discussion forums, wikis, and blogs; it is here that cultural patterns of consumption and production, gameplay strategies and styles, and other game-related sociocultural practices are negotiated and (re)produced (Rehn, 2001; Hine, 2009; Sköld, 2013). As we shall discuss later, these archives are dispersed and unstructured (in the traditional archival sense), but rich: new media retains a high amount of traces of social interaction that is well-nigh unprecedented in other media forms.

Besides providing a way to theorize the role of recorded information and new media in online gaming communities, the concept of archive is also useful because it frames usage patterns employed by such communities with precision. The practices of information production, consumption, and sharing in game-related new media environments have distinct archive-like diachronic and asynchronous qualities. On online discussion boards, for instance, conversations commonly take place over the span of days, it is expected that old threads are read before a new thread on the same topic is started, and sometimes year-old discussions are resurrected by a newly posted comment and therefore propelled to the front page and the center of community activity. In a study of the activities of the *City of Heroes* (Cryptic Studios, 2004) community on new media-site Reddit, Sköld (in press) shows that threads, much alike the life-cycle of archival records, often are drawn upon to inform matters they were not originally related to.

TOOLS OF INTERPRETATION: THE DOCUMENT PERSPECTIVE

Document-focused research provides an analytic perspective that suits the vein of study outlined above because it provides tools to explore how online gaming communities at the same time shape their new media archives—by posting, commenting, liking, et cetera—and are shaped by them (Sköld, 2013). What is here called the document perspective denotes a range of studies researching documents in professional (e.g., Harper, 1998) as well as leisure social worlds (e.g., McKenzie and Davies, 2010). The study of documentation has its roots in the works of Briet (2006) and Otlet (1989) and is a strand of inquiry in disciplines such as LIS and organization studies. As an interpretative tool, the document perspective highlights how documents function in different cuts of human activity, and furthermore puts into focus the context-bound activities (use, production, circulation) that relate to these documents. To give a few examples, Harper (1998), in his investigation of the IMF, characterizes documents as the outcome, detritus, and structuring agents of work in the organization. Similarly, McKenzie and Davies (2010) find that documents in conjunction with document work—that is, the activities associated with the documents—shape structure, priority, and meaning in everyday life. In document research, documents are furthermore viewed as the underpinnings of communities of both professional and non-professional natures because they provide the means to stabilize and negotiate the social reality of communities (Brown and Duguid, 1996; see also Frohmann, 2004, and Sköld, in press).

The definition of what construes a document is debated (e.g., Buckland, 1997; Frohmann, 2009) and, in practice, often heuristically derived; those artifacts of recorded information that play important roles in the sociocultural interaction of the area under study can be termed documents. Levy (2001, p.23) provides a definition that is useful in relation to the study of new media and online gaming communities. Levy describes documents as “talking things [...] bits of the material world [...] that we’ve imbued with the ability to speak”. From such a definition, and from the many observations of the prominent role

of new media in online communities, it follows that blog posts, Facebook likes, discussion board comments, and the activity logs of wikis plausibly can be studied as documentation.

The document perspective accentuates three principal and strongly interconnected venues of analysis and interpretation when applied to the study of online gaming communities and associated new media sites:

1. *The study of documents-as-artifacts*: this line of inquiry focuses on how documents are positioned in the doings and workings of the studied community or context (e.g., Harper, 1998; Berg and Bowker, 1997), which documents are drawn upon to inform and validate actions or viewpoints (e.g., Sköld, in press), and elucidates the material constitution (contents, layout, structure, material substrate) of the document (e.g., Francke, 2008).
2. *The study of doings-with-documents, that is, documentary practices and work*: Berg (1996) and Frohmann (2004) claim that it is what people are doing with documents that grant documents their crucial role in human affairs. Frohmann (2004) suggests that documentary practices should be analyzed as culturally and historically distinct, and as a part of certain sets of social discipline. Research focusing on documentary practices can investigate the reading and writing of documents (e.g., Heath and Luff, 1996), posting, linking, and commenting (as suggested by Sköld, 2013), and how documents are put to use to sustain and demarcate social formations of various kinds (e.g., Brown and Duguid, 1996; Frohmann, 2004).
3. *The study of the affordances of documents*: affordance (as per Gibson, 1979) is a concept seeking to describe how the material constitution of objects connects to what people are doing with them. A specific material constitution may encourage some modes of interaction while discouraging others. The concept of affordances is highly applicable in the study of documents because it can be used to theorize how the material constitution of a document interacts with its related practices, and thus consolidate venues of study 1) and 2) above.

TOWARDS THE STUDY OF GAMING-COMMUNITY INFORMATION INFRASTRUCTURES

Trace ethnography, as formulated by Geiger and Ribes (2010; 2011), is a methodology well suited to document-oriented inquiries of online gaming communities and new media both as a tool of analysis and as a way to prioritize empirical sites of study. Geiger and Ribes (2010; 2011) claim that present-day distributed social formations (organizations, gaming communities) are intimately connected to the information infrastructures they use for the purposes of communication. Often, these information infrastructures prolifically generate traces of the interactions they facilitate. For example, posts and comments are timestamped and linked to a user profile which, in turn, yields further information; activities are recorded in logs (e.g., Wikipedia's revision history); votes and likes are summarized and visibly displayed; thread titles and many other kinds of metadata are searchable and otherwise available for advanced queries. Geiger and Ribes view these traces as both indications of past activities and as recorded information in present use in the sustenance of sociocultural life. Inquiry into these traces can, according to Geiger and Ribes, make visible the activities of users and produce insights into the workings of local social formations. In summation, the perspective of trace ethnography benefits the line of inquiry suggested in the present section by showing how traces of interaction can be fruitfully interpreted as documents and documentary traces of great importance in the constitution of social formations in online environments—and for the researchers that wish to understand them.

Studying information practices and meaning-making in virtual play spaces

When playing in virtual play spaces, such as MMORPGs, players create sometimes fleeting and sometimes elaborate teams, groups and clans in order to succeed. These and other in-game social relationships can be understood in terms of information practice and meaning-making theories. Information practice theories, of course, largely grow from the field of information studies. The meaning-making theories considered in this section originate from a social interactionist perspective (e.g., Goffman, 1959), but relate strongly to the informational aspects of video gaming.

INFORMATION PRACTICES IN VIRTUAL PLAY SPACES

Information practices inside the game, and to a lesser extent in the expanded play space (including outside elements like manuals, blogs, and forums) can be observed similarly to those in any setting, game or non-game. Information practice models such as sense-making (Dervin, 1998) or everyday life information seeking (ELIS) (Savolainen, 1995) are particularly useful in this regard. MacKenzie (2002) offers one model of everyday life information seeking that has proved useful in studying the types of information practices that are used by players in an online environment to get the information needed to succeed there. She outlines “a two dimensional model of the information practices described by participants” (p.25). It includes a continuum of information practices from actively seeking out a known source or planning a strategy to receiving unsolicited advice. An examination of the ways in which players in the virtual play space appear to gather the information they need to succeed both in teaming with others and finding their way through the challenges of the game environment in the MMORPG *City of Heroes* (Adams, 2006) showed that tactics were parallel to those exhibited in real life situations.

The modes of information practice explicated by McKenzie are: *active seeking*, which is the most direct mode; *active scanning*, including semi-directed browsing or scans of the environment; *non-directed monitoring*, which generally includes serendipitous kinds of discovery; and *by proxy*, a situation in which an individual gains the information through the agency or intermediation of another.

Active seeking is the most direct mode of information seeking. In this mode the player seeks out an identified source in order to get answers to specific questions. An example of this type of information seeking is going to the manual or an official forum for information. Players, however, generally search actively in formal sources as a last resort, tending instead to rely on other information practices.

One form of active scanning observed in avatar actions in *City of Heroes* was scanning the environment, being alert for cues and clues. For instance, the blinking and pulsing of objects and the sounds of the enemies are signs to be looked for, and the information they provide is very important to reaching the goals in the game. The pulsing sounds are only evident when an avatar is within a certain pre-determined proximity of the object; so active scanning for the sounds and blinking are necessary.

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Non-directed monitoring, the third mode, can be compared to serendipitous discovery, encountering or recognizing a source. Often players learn about the interface by this sort of serendipitous discovery. Interestingly, much of this information may be formalized and available in sources such as the game manual, but players often prefer to discover the information by paying attention during exploration. The final mode of this information practice model is having someone else identify a person as being in need of information and offer unsolicited advice or refer that person to a source. MacKenzie (2002) calls this mode information seeking by proxy. In a game environment, the information provider might be another player, but could also be the game developers through use of non-player characters (NPC) and other such devices. For instance in *City of Heroes*, oftentimes an NPC, when assigning a mission to the player, will include some statement such as “You’ll meet a lot of resistance there, it might be a good idea to take along some friends”. This is piece of information that is supplied by the game creators who see the players as needing the information to succeed.

MEANING-MAKING IN VIRTUAL PLAY SPACES

Bolter and Grusin (1999) observe that some games encourage the player to “look through the surface of the screen and sometimes by dwelling on the surface with its multiplicity of mediated objects” (p.94). The real and the artificial levels of games are considerably blurred, but teasing them apart as far as possible seems vital to exploration of the games from the standpoint of meaning-making.

The combination of seemingly real and frankly artificial elements in the play space gives games a theatrical quality. Staged theater productions have some very real seeming and feeling elements which are affected by the interaction with the audience, just as games do, and likewise they both have some deliberately artificial conventions. While from a certain standpoint the entire game is artificial, it does in fact offer at least the illusion of reality, both visually and in terms of the cultural elements mentioned above. We enter into the game believing that we are about to interact with and be entertained by an alternate environment. As a result, the theatrical nature of game environments lends itself to analysis of meaning-making using a dramaturgical model.

As the name implies, dramaturgical analysis uses a theatrical framework to study sociocultural life. It is particularly concerned with meanings and the making of meaning. “Simply put, dramaturgy is the study of how human beings accomplish meanings in their lives.” (Brissett and Edgley, 1990, p.2) Although social dramaturgy specifically is not often used in information studies, the work of Goffman (1959, 1967) from which it emerges appears in the field, particularly the concepts of presentation of self and face work (Burnett, Besant and Chatman, 2001; Ellis, Oldridge and Vasconcelos, 2004).

“Definition of the situation”, defined as “the meaning that actors attach to the setting (including the presence or absence of others)” (Hare and Blumberg, 1988, p.154), is an important concept in dramaturgy. Every action begins with a definition of the situation, based on theatrical elements such as role, scene, costume, and so on, and ends with a new definition of the situation derived through social interaction. Thus players make new meanings or understandings. How the situation is defined, and made sense of, is of extreme importance to how the game is played and whether any particular team venture or play session feels successful. In every social situation there is an initial definition of the situation and a final definition of the situation, and meanings may change from one to the other.

This can be seen in *City of Heroes* in an examination of how roles and presentation of self change in

social interaction. The player enters through an avatar, as an archetype with certain powers and so forth. The ways in which she has chosen to costume that avatar, the powers chosen, and the mission at hand, among other things, define the situation for the player, as well as others playing with her. However, often a player will play the same mission repeatedly either because she has not yet completed it, or because she is asked to play by a group (for examples, see Adams, 2009).

RELATIONSHIP BETWEEN INFORMATION PRACTICE AND MEANING-MAKING

Much of what we call ELIS is researched by the use of individualized techniques such as interviews, keeping diaries and so on. The model of information practice referred to in above is an ELIS model, as it was created out of the experience of information seeking of a particular group of people (in this case, women pregnant with twins) seeking information in a certain context (MacKenzie, 2002). It, like most forms of ELIS, is considered a micro-sociological approach to studying information practices. Dramaturgy, on the other hand, uses social groups as units of analysis, and tends to foreground the concept of meaning rather than information. The results of dramaturgical analysis are more implicit in nature. In these ways information practices and dramaturgy, as ways of examining the subject of understanding the information practices and meaning-making in the virtual play space, can be seen as quite different from one another. Still, there are ways in which they are quite similar, for instance their micro-sociological nature.

There is a paradox in the fact that even though some ELIS models are built on the individual as the unit of analysis, they can be considered micro-sociological. But, they are built on the presumption that by looking at a number of individuals in a particular group, conclusions can be drawn about the information practices in the group. Dramaturgy is more clearly micro-sociological, because it grows from the roots of symbolic interactionism. It also concerns meaning-making or information in a group. In fact the unit of analysis in dramaturgy is the social group, not the individual. Therefore, it is an essential step toward the understanding of meaning-making in a social context. Dramaturgy has not been employed as a method of analysis in the field of information studies a great deal, but it is just one step from information practices, and a much more social approach to meaning-making in an information studies context. Combining the approaches provides a fuller picture of information practices and meaning-making than other models have done.

Some important similarities between everyday life information practices and the dramaturgical approach are the common concern with the everyday. Both models also consider information practices and meaning-making as situated in time and place. Both models are concerned with the users' definition of the situation (whether an individual or a social group), no matter how it is derived. The situation in either case is vitally important, because it is in context that information practices take place and meaning is both created and understood. Furthermore each of these models lends itself well to an ethnomethodological approach when we consider games spaces as having elements of culture. Individually and in combination they can provide an excellent theoretical and methodological lens for a descriptive analysis of information practices and meaning-making in the virtual play space.

Analyzing games as information systems

In this section, we examine the how the notion of information systems can be used in the study of

games. An important reason for employing this approach is that games are both artifacts and processes (Montola, 2012). On one hand there is the designed game itself; an object, a set of codes, or a concept, created by one or more people. On the other, there is the actual play for which the artifact is used. The systemic properties of a game become actualized once one or more players engage with them (Klabbers, 2009), and the game would not function without information that the players themselves bring into play (Crookall, Oxford and Saunders, 1987). A game's designer is therefore simultaneously creating the artifact and the potential play that it facilitates (Wardrip-Fruin, 2009). Nevertheless, players may impose their own play systems on top of the artifact (or at least parts of it), trespassing the limitations expected by the designers (e.g., Myers, 2010).

As game complexity—especially the number of players—grows, a new pattern emerges: the game is not one system, but actually two or more that exist in an interlaced form. At the core is an information retrieval (IR) type of system. It consists of the material input by designers into the game as an artifact, input that exists within the information ecology of the game itself. In an MMORPG, these include things such as item and skill properties, locations, game-internal information sources, quests, and so forth (see Harviainen, Gough and Sköld, 2012). In a live-action role-playing game, they include roughly the same, but instead of existing as code, the information has been distributed to players before play, and is thus more ephemeral and harder to both access and to preserve unchanged (Harviainen, 2007).

The second principal game-information system is a social information system that exists on top of the IR core (Harviainen and Savolainen, 2014). The social information system consists of player interactions, implicit rules, agreed-upon conventions (e.g., “we’ve decided together that this is a no-fighting zone”), as well as player-to-player economic transactions. This system furthermore extends outside of the play environment itself, as people share their game experiences, discuss rules and content, and so on, through blogs, forums and other channels (Harviainen, Gough and Sköld, 2012; Warmelink, 2014, pp.106–109). Whereas the IR level may be of primary interest to computer science and human-computer interaction, this level draws in researchers or communication, sociology, management, and so forth.

The social system also includes play that takes place beyond the intended or implied use of games. Huvila (2013) describes this as metagames, referring to the established game research concept of game-related second-order activities. Metagames rely on off-script behavior, breaking out of the game in one way or another (Aldred, et al., 2007). They are practices of gaming games, when players attempt to influence the game and, for instance, change its storyline (Jantke, 2010), or “play activities perceived by players as being ‘outside’ or ‘peripheral’ to the game, while still being important to the overall game experience“ (Carter, et al., 2012, p.11). Metagaming provides also means for players to take over the game they are playing and to use it for their own purposes (Tan, 2011). Steinkuehler (2007) emphasizes that metagaming engages players in theorizing their own game within and outside the limits of the game itself. This theorizing can take place in long and intentional discussions or as a part of game-related hands-on practices.

From an information research perspective, it is apparent that these very diverse informational activities have a major influence on gameplay. The availability, reliability and choice of information when discussing things with co-players, or choosing a guild or strategy to fight an opponent, have direct consequences to the (sometimes relative) success and outcomes of the activity. Further, playfulness, and unconscious and purposeful gaming of these second-order activities have similar influence on information practices and consequently on the primary activity of playing. In this sense, the choice of choosing

particular methods of seeking information in the game, using specific types of information or of relying on knowledge that should not be available for a player, can radically change players' fortune.

Relevant research questions can be, for example, how and why players exploit information that comes from outside of the game (see Consalvo, 2007), why certain information sources are preferred, why particular types of information use are perceived as metagaming and others not, and how and why the conceptualizations of metagaming differ from one player to another. The meta-activity is a distinct yet interlinked meaningful activity by itself, instead of being merely a part of the 'use' of information and information systems (Huvila, 2013). While distinct, it nevertheless forms an important part of a game's systemic whole (Harviainen, Gough and Sköld, 2012; see also Myers, 2010).

GAINING ACCESS TO SYSTEMIC INFORMATION

The challenge of applying traditional methods of research on games as information systems is that they both contain artificial limitations (and transgressions of those limitations) not as commonly found in the physical world (Harviainen and Savolainen, 2014), and asymmetric access to information. As the limitations and corresponding information practices have been discussed earlier in this chapter, it is now necessary to focus on information and asymmetry. According to economic game theory, information is either perfect or imperfect. Perfect information means that a participant has access to all relevant data regarding a situation, while imperfect information means that at least something is outside that person's control. This situation can furthermore be asymmetric, so that some parties have access to more information than others.

In games themselves, such game-theoretical assessments nonetheless prove insufficient. While an abstract game of pure skill (e.g., chess) deals with just perfect information, most games contain a mixture of varying information access and possession types, well beyond the dichotomy of perfect versus imperfect. Whereas a player can in theory have access to all information—that is, having a perfect grasp of the game—this does not mean they are able to remember or utilize all of it. Knowledge of a world is always incomplete (Wilson, 1977), and while an artificial world such as a simple game may be easier to comprehend and remember, the very artificiality of such worlds makes information gaps often inevitable. Therefore, a thorough analysis of a game as an information system, we believe, would require a detailed, phenomenographic analysis of the environment and its related practices, combined with a hermeneutical deconstruction of player interpretations of the play-space, game-related information sources, and their own experiences, and a review of all the paratexts and gaming conventions potentially referring to that game. This is rarely possible, so focal points of research are needed.

THE STUDY OF GAME-INFORMATION SYSTEMS: FIVE FOCAL POINTS

The researcher seeking to study games using the notion of information systems can use the following five points of focus. Each of the focal points overlap, and can fruitfully be studied in context with each other.

1. The information retrieval system

The retrieval system can first and foremost be determined by an analysis of the data and code it contains, including access points, emphases, and interfaces (Jørgensen, 2013), as well as the forms in which

they are presented (Myers, 2010). Supplementing those are the ways in which operational rules are described in handouts, guidebooks and so forth, which can be analyzed as documents, designer-created paratexts included (cf. Jara, 2013).

Another way of accessing this level of information is through player interviews, on their experiences with the IR system and its rules and interfaces, as well as their ability to analyze that system and compare it with others and the surrounding world, procedural literacy (Bogost, 2007). Some facets of the IR system are furthermore nearly impossible to research without using either ethnographic or interview methods alongside an analysis of the written core. Examples of such include brought-with information needed for the use of the system, as well as the way in which the system is largely spread out between players and organizers in a live-action role-playing game (Harviainen, 2007).

2. The social system(s)

The social information system contains all social interaction that takes place in direct contact with the game environment, but is not one player's interaction with the IR system. As a result, its facets can be studied with the methods of any field that deals with human interaction, including the analysis of information practices.

As the number of players grows, system complexity increases at a rapid pace. Because of this, tools such as collaborative information seeking (CIS), as described by Shah (2012), has become popular. Being task-oriented organizations, especially raid guilds engage in all five facets of CIS: collaboration, cooperation, coordination, contribution and communication (see Vesa, 2013). They also exemplify the ambiguity and tension common to such practices. Such patterns can be found in also other online play organizations, and we believe this to be a particularly fruitful avenue for further research.

Implicit rules of play, including social conventions upon which players have agreed, can be accessed through either interviews or ethnographic methods. To play against the implicit rules can be a (rather provocative) method for revealing and researching said rules (Myers, 2010). The ways in which players intentionally use the system for unintended purposes fall somewhat between the IR and social layers, and for those, we recommend using research methods selected on a case-by-case basis.

3. The expanded system

The way in which gameplay has expanded from the confines of the core systems both eases research and makes it more difficult. On one hand, scholars can now use the aforementioned methods (e.g., documentary analysis) to analyze forums, blog posts and so forth to see what players may have observed and experienced (or claim they have observed and experienced) during, or in relation to, play. On the other, they present a challenge in that their abundance forces a researcher to inevitably select only a part of the available material, effectively risking a bias. Crucial questions are such as what types of information is produced and shared, and on what forums (Harviainen, Gough and Sköld, 2012), and what parts of information are blunted (rejected as unwelcome; Baker, 1996) by players. This leads directly to questions of cheating, information ethics and information overload, that is, spoilers (cf. Consalvo, 2007; Sicart, 2009; Gough, 2013). For this, we recommend especially player interviews, as the lines on what counts as unwelcome information or cheating are very personal.

4. Boundaries

Between system layers and the expanded system is a boundary. It alters the information that is permitted to enter the world of fiction, or blocks it outright (Harviainen, 2012). The barrier is mostly based on a social contract, due to which it is inevitably porous, when players need to access information from outside of play. The exception to this are the interface and code boundaries of videogames, some of which act as the natural laws of the system (i.e., cannot be broken without fundamentally changing the nature of the activity).

As subjects of analysis in that area, we recommend a focus on the functions and porosity of the barrier: what type of information is let through and why. Key questions are, to what extent the participants expect the game world to be self-sufficient, and whether the play is supposed to be a goal in itself or for an external purpose (as in in an educational game). This is an area that requires a combination of document analysis, systems analysis, observation, and interviews, for results of any reliability.

5. Control systems

Crossing all four facets are issues of control. Power to influence game information—its availability, accuracy and applicability—resides primarily in the hands of the game’s designers. In a videogame, this can be the studio or the publisher. In a live-action role-playing game, the power is usually in the hands of one or more game masters, as well as the organizers (Harviainen, 2007).

The power can, however, shift to the hands of the players. Examples of these include tacit player agreements and social pressure (Myers, 2010) and intra-game (e.g., guild) leader or core member authority (Vesa, 2013; Warmelink, 2014). These structures, both formal and informal, are particularly well analyzed by way of participant observation, as the differing practices of various groups may not be visible to players, publishers or organizers themselves.

Discussion

This chapter has shown that information is an intrinsic aspect of games, and that inquiries that put information at the center of analytical attention have the potential to elucidate key workings and doings of games, players, gaming, and gaming communities. The three main sections of the chapter have also demonstrated that the study of information in the context of games can—and, indeed, should—be carried out in different ways. In the following, a small example analysis will make clear the distinctions between the three sections in terms of implications for empirical work and analytical focus. A common research scenario will serve as the point of departure:

It is time to write an outline in preparation for your next research project. Putting together a general description of the intended area of study as well as the analytical perspective poses no problems: you have already decided to study the popular and long-running MMORPG World of Warcraft (WoW) (Blizzard Entertainment, 2004) from the perspective of information. However, you also need to reflect on which information-centric analytic perspective to chose and how this particular perspective impacts the future study’s focus and choice of empirical sites. Additionally, and perhaps most importantly, you have to elicit how the study of information contributes to the understanding of WoW. This is where you have to put in some work.

The perspective presented in the section Archival inquiries is best suited to study what can be loosely

called communal aspects of play and games. Examples are guilds, groups of bloggers, users of a forum or site, and other groups that are an inseparable part of the sphere of WoW. In the study of such groupings, the object of inquiry also becomes that which is shared among individuals: patterns of behavior, the organization of work and responsibilities (e.g., who is tasked with what role at a boss encounter), culture, and practices.

When conducting research seeking to investigate WoW-related communal dealings with recorded information, it is important to identify key sites of interaction in the particular aspect of WoW under study. For instance, a study seeking to investigate the emergence of certain patterns of play in player-versus-player (PvP) combat may be well served by finding influential forums and databases where such strategies are developed and negotiated. If a choice has to be made between several sites of study that are deemed to be of equal importance, the one carrying the most diverse set of traces of user interaction should be prioritized; it will allow for the broadest access to the tapestry of communal sociocultural life. The study of artifacts of recorded information—along with the associated practices and infrastructures (wikis, blogs, forums)—constitutes a fruitful approach in WoW research because it centers attention on what can be considered as the the ground zero of online WoW-related social life. By studying information and its use it is possible to understand how groupings in the WoW-sphere communicate with each other, how they come to know what they know, and how sentiments and opinions and strategies are spread.

The section *Studying information practices and meaning-making* focuses the study of WoW on how players, in the act of play, make use of and gain meaning from formal and informal sources of information in order to succeed in the game environment. Examples of formal information sources include documentation created by the game developer and official game guides, while in-game conversations and player-driven forum discussions are instances of informal sources. Examinations of how WoW players rely on and use such information sources can offer insights about important aspects of WoW culture as well as a way of understanding how the knowledge and know-how critical to the success of guilds, PvP teams, and individuals are formed.

Another choice is to examine the meanings made in the course of playing WoW, whether those meanings are directly game-related or not. One way of doing so is to investigate the context and definition of the gaming situation as a series of theatrical metaphors. For example, what do the costumes of avatars and non-player characters tell others about them? What can we gather about the game world from the scenery (landscapes, architecture, décor)? How do such definitions and meanings change through the course of play? Through observation and conversation with players it is possible to study meanings made about the game world, and what is needed to succeed therein, as well as more personal and lasting redefinitions of self, as for example, how confidence built through gameplay is carried to another context outside of the game.

When planning a study of WoW using the Analyzing games as information systems-approach, the main focus of analysis becomes the game's core information retrieval (IR) system. In the case of WoW (and other videogames), this is the game code and its premier instantiation: the game. Players interact with the IR system continuously as they utilize items, get information from NPCs, and fight monsters. The skills and knowledge of the players are in constant use, as they read the game and react to it, performing various tasks and deciding on best courses of action. What is referred to as the expanded sys-

tem manifests itself in player discussions, metagaming, rejection of content spoilers and so forth, issues that can be observed using either archival inquiries or practice analyses.

In WoW, all these phenomena are particularly visible right before, during, and slightly after the publication of a new expansion or content patch, as the now extended IR system activates the social system to discuss both what exactly had been added, and how players react to those additions. The study of WoW from the information system-point of view should prioritize key IR systems and empirical sites where such discussions as are mentioned above are the most accessible.

Conclusions

During the course of this chapter, four principal levels of interconnection between the concepts of information and games have emerged. The following strata of information-in-games are, of course, intimately connected and in some cases interdependent.

1. *Artifacts, documents, information infrastructures, and information systems*: As seen in sections one and three, the *information viewpoint* centers the attention of the researcher on the manifold artifacts of recorded information that circulate in and shape the sociocultural life of gaming communities, along with the infrastructures that support the artifacts' creation, retrieval, storage, and dissemination. The information systems perspective shows how people utilize the properties of the system as a basis for social information practices.
2. *Activities*: All of the sections show that the study of information also can entail looking at what players are doing with information, that is, information practices (and related terms found in the literature, such as *information work* and *information behavior*). The information activity-approach sheds light on the strategies players employ to find information to accomplish, for example, gameplay goals, and how this information is shared among peers. The information activity-approach additionally affords the study of how gameplay is shaped by players' patterns of interaction with information sources external to the game.
3. *Knowledge*: Also, all of the sections demonstrate how investigations focusing on information are in a position to explore how knowledge is produced, organized, and managed in a game-related social formation or a field—and consequently, to gain insight into to how local social (gaming) worlds are maintained and negotiated.
4. *Context*: Common in all of the sections is the view of game-related information as something that is never universal or ready-made. Research on information phenomena can therefore put the specific conditions of the area of study into play, acknowledging that information is always both produced and consumed as a part of certain practices and with certain means (e.g., documents), and circulated in differing social worlds.

Taken together, these strata can serve to add to the discussion of how information in games can be understood and, because the conception of a phenomenon has direct implications for how it can be studied, hopefully inform future research in this vein.

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