What can DARWARS learn from the Game Industry about Communities?

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ABSTRACT

Social network analysis is an exciting and promising tool used for community management with online games. Can this also be applied to a DARWARS (Training Superiority) online training community? For example, will these communities be scale-free with "hub" users who disproportionately influence the training focus? How will these networks grow? We do not know, yet. But we do know that from the ongoing experiment of the online game world will come ideas and insights that will enable us to design and measure a DARWARS community.

DARWARS is a DARPA-funded effort to revolutionize training and increase military readiness by providing online practice combining a robust technical infrastructure with elements from computer-aided instruction, intelligent tutoring systems, and multiplayer games. The vision of DARWARS is to bring together trainees, trainers, subject matter experts across military echelons, geographic locations, as well as use-cases (training events, single participant after-hours, etc.) into an active community with different reinforcing interests: pedagogy, training, entertainment, and content creation. A challenge of DARWARS is to develop mutually supporting communities.

To forward our understanding of community, this paper will examine aspects of the online game world with which we expect our DARWARS community to share important properties. This paper will cite a number of illustrating lessons, related to community. In particular we will examine the content-creation role of community.

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ONLINE GAME COMMUNITIES AND DARWARS

Online game communities are examples of large social networks that span many subgroups. While game communities revolve around entertainment and related interests, DARWARS looks to communities to fulfill its vision of a large, sustainable, virtual training world. DARWARS sees in game communities a paradigm to engage its members, to assist in distribution of material and ideas, and to convey the values, lessons, and new content from its user community. The DARWARS vision for community is an online network-centric social system whose culture is supportive of the DARWARS transformational training vision.

In this paper we will examine the future role of community to an online training system such as DARWARS. This paper will examine the lessons from game-centric network cultures. We will highlight areas where we may develop our own understanding of the potential of a DARWARS-centric social network dedicated to online training, tutoring, and pedagogy. The DARWARS community vision is to extend the web-centric network model - e.g. Company Commander or Platoon Leader discussion forums - to a community encompassing many subgroups supporting a large training network.

Game-centric network cultures are typically composed of a (large) number of subgroups whose members may present themselves a variety of roles and persona. For example, a participant may be a guild leader in a game, she may be a technical novice seeking answers on the tech-help channel, and she may be a game design sophisticate in design channel discussions. Given the size of some game communities, e.g. EverQuest, a leading Massively Multiplayer Online Game (MMOG) with over 400 thousand subscribers, the combinations of relationships between members is considerable.

An online game community member might, for example, interact with a game community over the course of an evening in these ways:

1.) Exchange information in-game to strangers (role-playing).
2.) Exchange information out-of-game to strangers (meta-game)
3.) Collaborate with acquaintances on a task (role-playing)
4.) Collaborate with acquaintances on a task (meta-game)
5.) Share experiences and conversation with in-game friends.
6.) Share experiences and conversation with real-world friends who are players (in-game/out-of-game).

Measuring online games networks is tricky. For example, how does one quantify community relationships that can transcend a variety of communication styles and modalities (VoIP chat, instant messaging, in-game text chat, email, forums, wikis, weblogs, etc.)? Or how does one represent relationships that can also span both *in-game* and *out-of-game* contexts? How can one judge the importance of "pseudo-anonymity" in these community systems?

A truism from the game industry that that information can flow through game social networks with great agility and speed. Furthermore, recent data suggest that online gaming increasingly engages participation (Nielsen, 2004):

online games… surfers spending more than two hours during the month… more time spent on this category than sport sites and news sites during May 2004. More than 46 million or nearly one in three online Americans visited an online game site...(in May 2004)

What results is an *integrated* information structure that is responsive to a spectrum of information needs by its participants. This paper will focus on one aspect: the community of content creators.

CASE STUDY: DARWARS AND THE CONTENT CHALLENGE

A challenge posed by the game industry to DARWARS is how to populate those worlds with cost-effective, high quantity content. How to create and grow an online training virtual world and sustain it?

At recent Game Developer Conferences, speakers (e.g. Will Wright, Peter Molyneux) proposed game based "dynamics" and "emergent behaviors" as sources of new player experiences (content) in games. While Artificial Intelligence research and products may be exploited as opportunities arise, DARWARS will also rely upon its community as a source of content. For example, subject-matter-expert feedback, comments from participants, simulation/training scenarios, etc. This is analogous to game communities, where socialization components such as leadership, companionship, and help are often seen as critical content value-addeds from the coummunity (e.g. guild leaders, Steinkuehler).

Game communities are social systems built on information and shared experience. Shared experience may manifest itself in a game network as distributed artwork, fan fiction (stories on websites about game characters), game modifications (MODs), player tools (e.g. game calculators), help, authoring FAQ (Frequently Asked Questions) or tutorials, and of course chat and socialization, etc. The currency of this eco-system is sharing content to enhance the game or social experience. While we are sensitive to the breadth of game community activities as well as the future needs of a DARWARS community - our discussions in this paper will focus on an exemplar type of content creation.

Another aspect to content creation is software creation. Emerging from game communities is a MODing (from online gamer slang for modification) subculture. MODders have been characterized in some game genres (e.g. combat games) as "*driv(ing) radical innovation, transforming existing games into completely new experiences, sometimes new genres, for fun and glory (very rarely profit)"* (Herz). DARWARS is seeking to capture some of this contribution in its vision of future development of training products. For example, with its Ambush (Convoy Trainer) product, it is looking to grow a MODder community that can capture and contribute innovative and new training experiences.

Content sharing within a game community is a side-effect of a communal creative process. It is a means to an end, where the end is social, whether prestige, or game scenario-based storytelling. Nowhere is this more explicit than with the mod community. With MODs creation, the community is an ideas laboratory and a social system where content is created as a means of expression rather than an end. Consider:

...the extended gaming community, which endlessly critiques, modifies, and debates the limits of games. It equips this accidental laboratory. Its Web sites dissect and disseminate game mechanics. Its members demand the power to customize game software. "Level editors," used to create game maps and content, are now standard game features. But gamers did not wait for slick interfaces before diving into do-it-yourself development. The history of user-modified games -- "mods" and their more ambitious cousins, "total conversions" -- demonstrates the lengths to which technically facile fans will go to extend favored titles. These modes of customization reinforce games' experimental potential by opening game architecture itself to players. (Kevin Parker)

While a MOD sub-community tends to be tiny in comparison to the entire game community, they are nonetheless significant in absolute terms:

Although conventional wisdom pegs the community of modifiers for any specific game at 1% of its user base, this will expand in absolute numbers as more games offer modifying opportunities, and the international community of gamers grows. As the community takes hold and more toolsets improve, that percentage might increase. If there are an estimated 5-10 million hardcore gamers in the world, and 1-2% choose to become follow-on developers for top line products, there is a cadre of 50,000 - 200,000 viable developers who will develop follow-on content for products every year. Over the next 10 years, as products and practices embrace this path, that number could conceivably triple to 150,000 to 600,000 seasoned community developers. (Sawyer, 2002)

These developers, the 4th party developers (Sawyer, 2002), are outside the normal producer/ software-house channel. They emerge from the community and play a critical role in the viability of the entire game eco-system:

...major computer-game makers agree that mods are good for the industry. For one thing, they create a

rich secondary market for aging games being bought for raw materials. And some designers say that game makers can inspire loyalty, and sales, by creating games that remain fresh by lending themselves to modification or even serving as the basis for entirely different games. (Marriott).

The *4th party developer* is able to transform design and scenario ideas that for non-modifiable games may only exist as fiction or discussion into a product. The extreme example of this trend towards outsourcing in-game content is seen in MMOG experiments such as Second Life (2003) – where the player is actively encouraged to create content (transfer of intellectual property rights, right to exchange virtual goods for real money). Relinquishing control on the creation process does bring on new responsibilities. Put it this way, "90% of everything is crud (Sturgeon's Law)," and the crud needs to be recognized and filtered out. Communities can play an important role here in evaluating and selecting the successful products.

Game communities are dynamic social settings with a value-system similar to Open Source projects, e.g. "no hierarchy, self-organization, self-regulation, and no ownership structure" (Garzarelli). They produce a free product which is shared and vetted by the project community – developers and consumers. A significant difference separating MODs and Open Source, centers on the producer / consumer dynamic. For starters, MOD communities are not typically centered around a single product – instead they create large families of products revolving around a single core platform (game). They enjoy now a view of a software creation ecosystem that Clay Shirkey imagines the larger software industry is migrating to – a business structured around a highly interleaved and socialized development processes:

Part of the future I believe I'm seeing is a change in the software ecosystem which, for the moment, I'm calling situated software. This is software designed in and for a particular social situation or context. This way of making software is in contrast with what I'll call the Web School (the paradigm I learned to program in), where scalability, generality, and completeness were the key virtues. (Shirkey 2004)

The fast development cycles of game MOD versions gives them a situated quality where producers and consumers are locked in tight collaboration: comments are posted in the forum, a new version is released, etc… Large Open Source software projects are not typically able to offer this kind of agility given their longer development cycles. In games MOD development we see far-flung communities converging upon a common game platform to create a number of independent and interrelated products. Corporate development practices such as "collaboration innovation communities" (Chan and Lee) and Communities of Practice (COP) tap into the "situatedness" of community to help corporations handle unstructured problems as well as distribute information outside of established organizational boundaries.

Game communities differ from team-oriented structures by their objective (accomplish a task, versus community). Game-centric networks are more like COPS. COPs are work-related groups of people who share their expertise by interacting on an ongoing basis with the whole group (Dube et al). They are best suited for handling unstructured organizational problems that require sharing across organizational structure (Lesser, 2001) .

Game-centric networks differ from COPS by their scale (thousands versus dozens), the multitude of personas/identities and roles members can adopt, and by the churn rate among its membership. Despite the differences, however, the differences between a team, a COP, or a game-centric network to perform and satisfy its membership's interests depends on their ability to move information effectively. Or borrowing from the common language of team theory:

…Teams with better access to other teams inside and outside the organization finished their assignments faster… Teams with better connections discovered, and transferred, the knowledge they needed within the organization. (Valdis and Krebs).

Beyond the similarity of their ownership philosophies, an important difference between the Open Source movement and MOD creation culture stems from the fact that MOD creation involves mostly media assets (rule of thumb, 80% of game development is devoted to media assets). Because MOD development is skewered towards the artist community, which hasn't yet been inculcated *with the open-source, potluck, give-and-get ethos* (Costikyan) in the way the software developer community has been, this leads to a different culture and social dynamic.

The DARWARS vision is to look to the community as a *motivator* for content creation. The confluence of these two forces: an agile information network, and mutually supporting *shared interest*s among members – we hypothesize will become future content

multipliers. DARWARS, like the game industry, will seek the 4th party developer where possible as well as look to socialization within the DARWARS-network as important content sources. Content is expensive to produce and yet large quantities of it is necessary to keep a game world and a training world fresh and engaging.

UNDERSTANDING THE STRUCTURE OF COMMUNITY

One view of a community is as a network of nodes, and between nodes are links. What is a strong link? What is a weak link? How to measure a performing DARWARS communal society? One way to start is to think of the DARWARS as a community network, a digital infrastructure that is "*designed to strengthen bonds and build social capital between members of a community, facilitating accomplishment of goals.* (Chewar et. al.)"

Networks are a useful abstraction for viewing communities from above, the details though is dependent upon the community and its interactions. Consider these introductory remarks on the appearance of social networks:

One of the things that has been discovered is that social networks, left to themselves, tend to be lumpy. Social bonds can have various properties, and it is difficult to describe exactly what constitutes a "strong" link, but an overwhelming characteristic is that generally the strong bonds come in clusters, the people you have strong bonds with tend to have strong bonds to each other. For example, you probably have strong bonds with your parents, who have a strong bond with each other (even if divorced, social bonds indicate intensity of a relationship and no matter how your parents feel about each other it is unlikely they are indifferent), and with your siblings. (Dave Rickey)

Highlighted is the property of "lumpiness" – while intuitively it feels correct, the details are rooted in the specific model. E.g. what **exactly** does a *strong* or *weak* link mean? What is meant by a *relationship* between two participants in the community? There is a spectrum of possibilities. For example, on one end relationships can be thought of as "political bargains" (Shirkey, March 2003) reflecting tensions between the individual and community norms. Whereas at the other end, relationships are quantified by an information-flow perspective (Fang and Huberman).

Social networks are frequently (though not exclusively) described as *scale-free* (Barabási, Albert and Jeong) in that some nodes are more interconnected than others. Scale-free networks define situations where power-laws arise and hubs emerge. For example, the WWW is often cited as a good example of a scale-free network - not all sites are equally well connected, and some sites have emerged as large hubs linking large swaths of other lesser sites (e.g. Yahoo). An interesting characteristic of hubs and scale-free networks is that they are:

resistant to random failures because a few hubs dominate their topology… Any node that fails probably has small degree (like most nodes) and so is expendable. (Strogatz)

This is a fortunate for game communities – they need to be robust to participants dropping in and out (especially casual players). Potentially this is important to a DARWARS community where members are likely to be dropping in and out of because of mission and deployment commitments. The ability to gauge the resilience of a community at any point in time would be a useful objective. This can represent both qualitative and quantitative measures of a community network. Consider a network configuration described qualitatively as having "porous boundaries, e.g.:

The end-goal for vibrant, sustainable community networks is the core/periphery model. The periphery is the open, porous boundary of the community network. It is where new members/ideas come and go. It is where inflows and outflows of knowledge and innovations occur. The periphery monitors the environment, while the core implements what is discovered and deemed useful (Krebs and Holley).

However, over time we may want to be able to monitor the membership relative to boundary permeability and information flow – we would need a measuring stick. Measuring sticks are also useful when comparing networks. One needs to guard against erroneously translating a value-system from one community into another.

A good example concerns Pareto Law effects in community systems. The economist Vilfredo Pareto (1848-1923) noted that "20% of the population owns 80% of the wealth". This is documented in online societies (e.g. Shirkey, February 2003) and online games (Koster, 2003). Their effects have been observed across a range of medium: e.g. from weblog and guild networks (scale-free) to in-game resource distribution. Online participants tend to instinctively

view power-law distributions with suspicion (concentration of power). Yet, the actual experience in online worlds with Power Law distributions is more forgiving. For example, online game economies are frequently cited as broken because of their extreme power-law distributions. Consider this comment with respect to Star Wars Galaxies (an MMOG, 2004) economic data:

"The wealth distribution is not just unequal, it is incredibly unequal…it is similar to the distribution of wealth in (real-life) economies… but even the worst robber-baron economies were not this bad… I'm more convinced than ever that virtual-world economies are such strange beasts that we (meaning academic economists) don't even know what 'health' would be." (Castronova).

Yet, these comparisons can be misleading. In online economies, power-law distributions may be encouraged for external considerations (open-economies + "treadmills" = better entertainment) or they may reflect internal considerations that mitigate their impact (non-zero-sum interactions).

Similarly, power-law distributions are often exaggerated in online web-centric social networks. Individuals in real world networks tend to be more constrained in the number of relationships they can develop and maintain (Emily M. Jin, Michelle Girvan, and M. E. J. Newman). Online relationships incur less logistical overhead – thus potentially enabling power-socializers developing large number of social contacts. This leads to networks with more pronounced clustering around a smaller number of nodes.

A hard questions is how to adequately measure and evaluate the social network when community members are *simultaneously* active in different parts of the community operating in different social modalities. E.g., an in-game discussion may start out *in-character* but then slip from role-playing into an *out-of-character* question about game rules that in turn leads the player to peruse an out-of-game fan site resource or forum discussion (WWW) that is then brought into the conversation via a browser. How can one evaluate the relative efficacy (utility) of the various communication transactions?

Further complication reflects that choices and hence information flow may involve factors outside the current state of the relationship network. For example, what is the strength of the relationship between Joe and Bill (real personalities) when the interaction between Joe and Bill can potentially involve many different persona:

- Real-life friends
- Forum discussion acquaintances
- In-game role-playing

This difficulty is fundamental. Because online game communities are built around memberships able to project multiple identities and persona: what is the best model of such a community network? Part of the difficulty is hinted at by research into utility models for in-game avatars (e.g. "Castronovian Utility Functions", Yamaguchi).

Castronovian Utility Functions apply when community members split time among many online identities (e.g., in-game avatars, "characters", different forum identifies). These utility functions maintain that one should model the time allocation choices across the different persona. This is in contrast to modeling the player as an agent who is engaged in optimally selecting and consuming choices. Community members are confronted with choices constantly – and their decisions can vary wildly depending upon context.

GROWING AND MANAGING MEMBERSHIP

A set of challenges are posed by building our DARWARS community. First, can we motivate sufficient people (both numbers and the right types) to participate; Second, can we shape the resulting community into norms that are aligned with DARWARS vision; and Third, can we incentivize (and facilitate via tools) the self-organization required for a community to gel around vibrant and productive subgroups?

Mulligan (1998) articulated the three basic lessons (below) from the online games community.

1. *Recruit and train a whole corps of sysops (system operators), with an emphasis on solving problems for players;*

2. *Build the correct administrative tools to allow the sysops to do that job…*

3. *Make sure your sysops and customers understand they have the authority and responsibility to deal with these issues.*

She suggests a proactive community and customer-service managed approach. She goes on to cite a set of typical player community profiles- one set representing a set of games where communities are managed properly, and one set where they are not.

The pattern for a successful managed group is to see gradual growth in the player community to about month 4. Thereafter the population may grow and see another peak at about month 7 when word-of-mouth effects are felt. After the 7th month, the player population stabilizes and volatility is decreased as churn lessens.

In contrast to this, Jessica Mulligan is able to cite another set of poorly managed game communities where after the initial 4 and 7 month peaks the games fail to stabilize the player community churn – this leads to a collapse of the player base.

Gattick identified the following seven traits of a successful social community. A virtual community, he argues, needs to implement at least three of these:

(a) personal relationships making up a social network sharing a certain degree of intimacy,
(b) simple and open access to the community for interested parties,
(c) personal meetings and understanding of each other,
(d) dialogue and feedback as well as shared experiences,
(e) personal, political, social and economic obligations of community members to each other and outsiders,
(f) sharing of some ideological beliefs (e.g., religion) and/or purpose (e.g., gaming and profession) and, finally,
(g) a common history.

While there is no fool-proof recipe, there are guidelines. For example, one should, with very large social networks, guard against creating large unstructured community spaces: the groups that arise there may not act in their own best self-interest. Communities are built upon stakeholder and ownership identities, real or imagined, that need mechanisms for conflict resolution and structure. Without such, groups will fall into a basic set of self-defeating patterns (Shirkey, March 2003); groups need structure in order to:

…defend the group from itself. Group structure exists to keep a group on target, on track, on message, on charter, whatever. To keep a group focused on its own sophisticated goals and to keep a group from sliding into these basic patterns. Group structure defends the group from the action of its own members. (Bion)

Because, online communities are built on systems of trust, they need to recognize it as well as incentivize their long-term development. Watson frames trust within a broader set of factors that shape a participant's view of a virtual community: *sincerity, intimacy and norms*. This is a view that is incremental and persuasive rather than controlling in its *modus operandi*. The question from a community building perspective is asked by Olof Agren (1999) in this way:
Does participation in virtual communities generate any added value for the participants, and, if so, how can this value be described?
He goes on to suggest that the basis of interaction in these communities is a "social capital" that can be measured by its productivity – *"some goals can be achieved easier with this form of capital than without it."*

A community social capital system can take on an economic flavor – e.g. conformance to social norms is a production value mediated by trust (e.g Kuro5shin). Lampe and Resnick (2004) through their study of the distributed moderation scheme of the popular Slash(dot) weblog point to conflicting goals of "*timeliness, accuracy, … influence of individual(s)… the effort required of individual(s).*" These considerations, can be seen as allocation choices, again moderated by a currency of trust.

Beyond just metrics and accounting – a measurable model of social capital within a community must still be accountable to the behavior of the network. E.g. do the dynamics of the network work to the benefit or detriment of the community goals? The larger the community, the more sub-groups, the more problematic. Scale is a problem to communities because it presents barriers to participation as well as introduces a self-destructive feedback:

…Scale alone kills conversations, because conversations require dense two-way conversations. In conversational contexts, Metcalfe's law is a drag. The fact that the amount of two-way connections you have to support goes up with the square of the users means that the density of conversation falls off very fast as the system scales even a little bit. You have to have some way to let users hang onto the less is more

pattern, in order to keep associated with one another (Shirkey, March 2003).

Thus, large communities must foster subgroups whose clusters define cohesive groups of members linked by strong ties. Sub-groups are then linked by a network of weak-ties. Koster (2003) suggests, from online game data, that clusters will cap out in size at about 150 individuals - a number that roughly corresponds to the observed maximum size of guilds in online games. In the language of White et al. we might think of the groupings as the "cohesive subsets" of a larger DARWARS community organization.

While the clusters are important elements of a community – e.g. serving as focus or task groups – the weak links that bridge them are critical, they are the casual relationships between individuals. Granovetter (1982) documented the importance and power of weak links in a community ecosystem: weak ties touch other clusters in the social network and therefore are more likely to represent information transfer points. In other words, novel information is more likely to travel across a weak link than a strong one.

This ability of a large distributed community to align itself into clusters and around different hubs is critical for content creation. The responsiveness of those alignments to new members and new DARWARS inputs is an important barometer of the health of the community.

Ultimately, however, the fitness of the network is not a complete measure of the health of a DARWARS community. A DARWARS content creation community will still need to be measured in terms of externals: how much content is produced, what quality is it? In the parlance of corporate communities of practice, e.g. Lesser (2001), communities CREATE social capital to IMPROVE organizational performance. In a corporate performance model, that may include employee learning rates, customer responsiveness, innovation, etc.

DARWARS will need to develop an equivalent model of organizational performance. To the extent one can model accurately a community network and measure it both in terms of its internal structure as well as its external performance goals – these can be useful tools to indicate the health of the DARWARS community system.

CONCLUSIONS

The vision of DARWARS is to bring together trainees, trainers, subject matter experts across military echelons, geographic locations, as well as use-cases (training events, single participant after-hours, etc.) into an active community with different reinforcing interests: pedagogy, training, entertainment, and content creation. A challenge of DARWARS is to develop mutually supporting communities. In this paper we examined the role of a content-creation component to a DARWARS community system, based on the experiences of the gaming world. A DARWARS "mod" community, while not the only community function anticipated, is important because it cross-cuts some many community interests.

We believe that the DARWARS community will broadly share a number of important properties with online gaming communities. We also believe that the most important features of such community designs involve openness, yet specialization around special-interests. A good measure of the overall health of a DARWARS community will be whether the community is actively creating new content.

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