The Enrollment of a New Technology and the Subsequent Redistribution of Roles and Responsibilities in an Online Game

Abstract: Using actor-network theory and distributed cognition, this paper describes how a new third-party modification ("add-on") was adopted and enrolled into the coordinated action involved in team battles of a player group in the massively multiplayer online game *World of Warcraft*. The add-on was instrumental in helping the group become efficient and successful with many in-game battles. Interestingly, after playing a *temporary* role, its use was no longer necessary for a specific in-game encounter, since its original intended role never needed to be filled in that specific fight. This analysis helps us see that people and their material resources collectively share responsibilities and that the distribution changes over time as new challenges are met and as new actors enter the network.

Keywords: Ethnography, collaboration, video games, actor-network theory, distributed cognition

Introduction

This paper uses an actor-network theory (Latour, 1987, 2005) and distributed cognition (Hutchins, 1995a) lens to document how a new technology was enrolled into the work of an existing player group within *World of Warcraft* (WoW), necessitating a change in how roles and responsibilities were distributed among all the actors in the

network. This work is important to education because it helps us understand how distributed networks of coordinated work changes over time as new technologies are introduced, something which other formal and informal settings must take into account when engaged in collaborative practice. Drawing on a tradition of massively multiplayer online game (MMOG) ethnography (Taylor, 2006; Steinkuehler, 2007), I studied and played with the player group for ten months, collecting chat and video data of our gaming sessions, and used discourse and interaction analyses to understand the data.

The new technology or actor was a third-party modification or "add-on" to the game and was first introduced to the WoW gaming community about four months into the study. It was adopted, first slowly then readily, by the group under study, as its services became increasingly clear. It was instrumental in helping the group become efficient and successful with many in-game, coordinated battles against formidable monsters during an activity known as "raiding." This process occurred in multiple nested networks, from the local "arrangement" (Stevens, Satwicz, & McCarthy, 2008) or "assemblage" (Deleuze & Guattari, 1987; Taylor, 2009) of individual players to the larger arrangement of the group. It also occurred across multiple timescales (Lemke, 2000), from micro actions and reactions to in-game events to macro changes in overall strategy between individual gaming sessions over several weeks.

Notably, the add-on played only a temporary role in the raid group's assessment of a specific encounter, the last monster, Ragnaros, in a fiery cave system known as Molten Core (MC). It helped the group by testing and ruling out a possible diagnosis of the problems with the group's strategy. After eliminating that possible diagnosis, its use was no longer necessary, since its original intended role never needed to be filled in the

fight against Ragnaros. This paper is a story, in other words, of how a historically-based network of online gamers was disrupted by new technology that coincided with unexpected in-game events. It is a story of the redistribution and renegotiation of group responsibilities done by the network's dynamic, adaptable actors to overcome those events, using the new technology in innovative, unintended ways.

Theory: Mangles, Networks, Assemblages, and Arrangements

In a nod to Pickering's "mangle of practice," Steinkuehler (2006) described the practice of gaming as an emergent one with multiple contentious parties attempting to steer what it means to play in certain directions, such that gaming is a complex arena of activity. Pickering's mangle (1993) described the dialectic of resistance and accommodation that scientists engage in with the natural world, constantly tweaking their instruments and mental models of how the world works when existing measurements produce puzzling results. Both of these concepts about how gaming or scientific practice works come from a view of these practices as existing in specific settings and circumstances. They recognize that authentic practice "in the wild" includes a multiplicity of parts, parties, or actors, acting separately yet collectively, such that collective roles and responsibilities that make the practice what it is are distributed across all of them.

Note that this takes Hutchins's view of distributed cognition (1995a, 1995b) one step further. In his descriptions of how a naval vessel navigates (1995a) and how an airplane cockpit remembers its speeds (1995b), the people in those activities offload many of their cognitive tasks onto their material resources, such as using pencil and paper

to jot down numbers. Not only are these external material resources being used to help people remember certain things in the activity, but they are also, therefore, assuming certain responsibilities. The material resources are not only helping; they are actually *doing*. The further step flattens or equalizes the view of the various actors in the activity, such that the distinction between whether an actor is human or nonhuman has no bearing on how specific tasks within an activity are accomplished.

This is one of the main tenets of actor-network theory (ANT) (Latour, 1987, 2005; Callon, 1986; Law & Hassard, 1999). The roles and responsibilities within a network of activity are assumed by both human and nonhuman actors, or, in more precise language that foregoes the human / nonhuman distinction, the roles and responsibilities within a network are distributed across multiple actors. It should be noted that the various parts that can act and be acted upon are not necessarily objects or characters in the strict sense. Instead, known as *actants*, individual objects, a collection of objects, or parts of objects can be assembled to have one function that is related to or associated with other actants. Furthermore, these actants can be both material *and* semiotic; they can be the physical stuff in the mangle *and* the ideas, values, and structures involved in the mangle, such as those found to be embodied or encapsulated in an organization or institution. For the purposes of this chapter, I will be referring to *actors* in the actor-network of raiding activity. In describing some of the "nodes" in the network, though, such as Blizzard Entertainment as an official group with certain values that force it to act, it may be more appropriate to use *actants*.

A network stabilizes when all the actors within it are in agreement on how the responsibilities are distributed (Sismondo, 2003). New actors—such as the new add-on

my raid group adopted into its sociomaterial practice—are added to the network through a process of *translation* whereby they are *enrolled* into assuming certain roles and responsibilities (and agree to let others take on the other roles and responsibilities that are needed for the activity to work).

A network becomes destabilized or is disrupted when an actor rebels or when a new situation within the setting arises such that the current stable system is not sufficient to continue accomplishing its joint task. This necessitates a change in how roles and responsibilities are distributed. Sometimes this is a matter of reassigning them. One example of this is when a timer add-on for my raid group became out of sync with our activity. One of our human actors then took on the role of timekeeper and announced to the rest of us when certain events would occur during a fight. Sometimes disruptions require a new actor to become enrolled into the network.

Flattening the setting allows Taylor (2009) to say, "we do not simply play but are played. We do not simply configure but are configured (Akrich 1995; Woolgar 1991)" (p. 6), emphasizing the fact that objects in a network exist in such a way as to be compelled to act or be acted upon. She calls these configurations assemblages, partially invoking Deleuze & Guattari (1987) who considered their *A Thousand Plateaus* to be rhizomatic, with the ability for the chapters to be read in any order, taking on multiple configurations or assemblages.

Open-ended and partially open-ended games, like WoW, are emblematic of the idea that any given player's history of activity is made up of a collection of units (Bogost, 2006), arranged together into particular patterns (Stevens, Satwicz, & McCarthy, 2008), constrained by the game's underlying rule systems and the player's deepening

understanding of those systems. A good gamer is someone who can recognize these patterns and understand the rules governing them well enough to exploit them to succeed in his or her in-game goals (Koster, 2004).

With a multiplayer game, many of these rules are tacit conditions of participating in a community of other players. As Malaby (2009) notes, the existence of rules about how to be or act is what makes online gaming spaces nontrivial. They are *contingent* spaces where players build up cultural capital by performing or acting successfully. The more contingent an act—that is, the more risk involved—the more the act is meaningful and a marker of expertise. Though Malaby comes from cultural anthropology, what he says aligns very well with Lave and Wenger's (1991) ideas about how novices to a setting can go through a process of *legitimate peripheral participation* within a *community of practice*.

This process of learning the game, or, more precisely, learning legitimate gaming practice, occurs on multiple timescales. Much like Lemke's (2000) example of change in classroom practice, changes in gaming practice can be seen on multiple levels, ranging from scales that measure from month-to-month, showing relatively slow changes, to scales that measure from minute-to-minute, showing split-second decision making based on in-the-moment changes to a given gaming session's configuration. These split-second decisions and the experiences that result from these decisions have a way of narrowing-down and tightening-up future performance where players have learned what works and what doesn't work for particular patterns of arrangements. This process is interdiscursive (Silverstein, 2005) and social: Players share their experiences with each other, make

arguments about what they think is happening, and refer to previously shared experiences to help them manage and negotiate their dynamic roles.

Description of Game and the Actor Network

World of Warcraft follows a tradition of role-playing games loosely based on *Dungeons & Dragons* (Gygax & Arneson, 1974; Wizards of the Coast, 2008) set in a Tolkien-inspired fantasy world (Tolkien, 1954/1955) full of exotic locales, aggressive monsters, and glory to be had (Blizzard Entertainment, 2004). Each player chooses a type of character class to play (e.g., a brawny warrior, a backstabbing rogue) and the race of his or her character (e.g., orc, human). Character class and race determine one's initial attribute values (Strength, Agility, etc.) and the available abilities or actions one can perform (such as the rogue ability Sinister Strike). The abilities from one class complement those from a different class, encouraging players to team up and cooperate by forming small parties and larger raid groups to succeed in difficult game encounters. These groups would play online simultaneously, going into the same in-game zones together to defeat common foes.

In representation, each character fit into an archetypal role based on the fantasy genre, but, for the purposes of the underlying game mechanics, these various hero classes can be roughly categorized into a function-based tripartite consisting of "tank," "healer," and "DPS" (see Table 1). Each of these categories has specific duties and responsibilities to carry in a raid battle. Tanks, with their plentiful health points and massive armor, must keep the monsters occupied and focused on them while healers continually spend mana or magic points, casting spells to make sure the tanks stay alive. DPS (shorthand for

damage per second, a way of valuing damage dealers) can then go about actually killing the monsters.

Table 1
Roles in World of Warcraft *by Character Class (Horde-side, Spring 2006)*

Role	**Classes**
Tank	Warrior (defensive stance), Druid (bear form)
Healer	Priest, Shaman, Druid
DPS	Rogue, Warrior (non-defensive stance), Druid, Hunter, Mage, Warlock, Priest (shadow form), Shaman (elemental spec)

Each role in the tripartite is necessary to be filled for a raid to be successful. A monster, however, generally attacks whomever it deems is the most threatening to their survival. If a DPS hits particularly hard or a healer heals too effectively, the monster may take notice and decide to hit back. Whoever has the monster's attention is said to have "aggro," and the monster switches targets when players "steal aggro" from others. Tanks can try to prevent this by activating various abilities meant to maintain aggro, while the DPS and healers try to keep their performance at an even, consistent, predictable level without "bursts" that would make the monster take notice. In other words, many of the encounters in WoW are a balancing game where the three roles work to maximize their efficiency while keeping the tanks the focus of the monsters' attention.

The way in which a monster decides who to attack is completely reactionary to the actions of the raid members. The underlying "brain" of the game creates a table that includes a row for each raid member, and in each row is a number that starts off at zero and increases a certain amount every time that particular raider activates an ability. The amount depends on the ability. This number is called the "threat level."

When the raid group I was part of first started, we each had to internalize our threat level and play it by ear, so to speak. There was no common resource or explicit knowledge of specific numbers associated with specific abilities. In fact, many of us did not really know that threat was based on a constant cumulative number. We surmised that threat was loosely based off of damage dealt, but we did not know that it was a cumulative of all damage over the course of a fight, no matter how long that fight lasted.

About four months into our raid's life, we started using a new add-on called "KLH Threat Meter" or "KTM" (Kenco, 2006). KTM did the work of keeping track of which abilities a particular player used while fighting a monster and how much threat those abilities generated. It then displayed that information to that player. What's more, any instance of KTM could talk to other instances of KTM installed on other people's machines and thereby aggregate all of the threat data for all players who had the add-on installed, displaying relational charts of everyone's threat level to each player (see Figure 1). This allowed the offloading of human cognition to a nonhuman resource, effectively eliminating much of the guess work that went into *World of Warcraft* fights.

Before the add-on, my raid group had progressed to Ragnaros, the last boss in Molten Core. Our raid practice included chat that was multi-threaded and interleaved, hierarchical and specialized, roughly divided by class role (Chen, 2009). One thing this allowed us to do was to be highly coordinated in our tactical take-down of a raid boss. By the time KTM was introduced, we had become quite proficient in dividing up our attentional resources and communicating along specialized channels. After KTM became the standard, the necessity of using those chat channels lessened. Suddenly, any player of any class could keep track of the threat generated of all the other players. Not only did the

add-on help us with our cognition, it's use also forever changed who communicated with whom about what, most notably allowing raid leaders to caution specific raiders about their threat generation. This effectively substituted knowledge-based trust in others with a technological advancement where trust or faith in other players' ability to manage their threat didn't matter. Yet, at the same time, KTM let us be much more efficient in our monster killing.

Figure 1. A section of my user interface during a raid battle, showing various add-ons in use. KLH Threat Meter (KTM) can be seen on the left side, displaying the top ten current threat levels of various members of the raid group. Warren and Wendy, colored in brown, are the main tanks for the group. Roger, in yellow, is a rogue. Thoguht, my character, is in red only because the color red was used to display the player's personal threat. If this screenshot was taken on someone else's computer, Thoguht's threat level would appear in yellow like Roger's.

Results: Using KTM as a Temporary Actor

Managing threat, relying on the tripartite class roles, is pretty much the paradigm for how fights worked in all fantasy MMOGs. Blizzard designed encounters that tested out different ways to alter threat mechanics. One example is the Ragnaros fight, in which Ragnaros would regularly push away or Knockback all characters within arm's reach

including the tanks and then throw balls of fire at random characters who were standing outside of arm's reach.

In a crucial session of raiding representing some of our earliest attempts at killing Ragnaros, the rogues in the raid group (there were five rogues, myself included) knew what was supposed to happen in the Ragnaros fight. Yet, for some reason, we kept dying. Ragnaros would, once in a while, focus his attention on and kill a rogue.

Naturally, we thought that this meant we had an aggro problem, leading one rogue, Roger, to tell the others how to play:

> this is a steady high dps fight, no bursting, bursting will get you aggro, in my experiance (sic), anything over 1000 gets rags to say hi to ya

Roger believed that threat was not an additive measure and that gaining aggro was simply a matter of moment-to-moment damage output. If damage output was ever too high in a particular instant in time, aggro would be gained. This goes against the tests done by Kenco, the creator of KTM, that resulted in his relatively accurate threat meter—accurate because it treated threat as a persistent, cumulative number representing the sum of all threat generated with all abilities used during a particular fight.

Since I had the KTM add-on installed, I had an idea that it wasn't our threat generation that was the problem. Yet, my personal understanding of how threat and aggro were calculated likewise was still forming, so I could not recognize Roger's misconception. Also, all I knew was that *some* of our threat levels were nowhere near the tanks' levels, but since not all of the rogues had installed the add-on at that point, I could not say for sure if it was true for all rogues.

After our second attempt at killing Ragnaros for the evening, another rogue, Rand, said, “I got aggro on that one. Not sure how, was using the same technique as last time.” To this, I replied:

> so, I have threatmeter on... noticed I wasnt very high up and did a cold blood evis [high damage abilities] just fine.
>
> I strongly suggest you get the mod... so you can judge how good you are on aggro

This response was further indication that I could not say for sure that Rand did not have a threat level problem, but I did confirm that aggro was not gained simply by doing burst damage. Note that, at this point, I had already enrolled KTM into my personal arrangement, placing my whole trust into this nonhuman actor for certain responsibilities. I knew that my previous practice of keeping the *feeling* of threat in my head was inexact, and I assumed that this blackbox of a tool could do it better than me. KTM, in turn, gave me permission to push the limits of damage, and it also let me enroll it as evidence for why threat wasn’t the rogues’ problem.

Eventually, on our fourth attempt, it became clear that the rogues were pulling aggro even though they were nowhere near the threat level as the tanks. This was demonstrated when Roger died after the first Knockback. When Roger used the general raid channel (instead of just commenting to the private rogue channel) to say, “i hit him once. that made no sense,” the raid leader, Maxwell, replied with:

> Roger, they [the tanks] may have been out of position for just a second which is enough for anyone else to get aggro who is in melee range.

Elevating his talk to the larger chat channel elicited new information from Maxwell that further helped the rogues diagnose aggro problems. Maxwell was correct. The reason why rogues were being killed was because we were running into position and getting within Ragnaros's melee range before any tanks had gotten in range.

This new information from Maxwell added to the information that I presented to the other rogues in the previous fight from the threat meter add-on, such that, by the time we fought Ragnaros again the following month, we had put it all together and delayed our approach to Ragnaros after a Knockback so that a tank got within melee range first.

By using KLH Threat Meter to see that our threat level wasn't high enough to theoretically pull aggro, the rogues had to think of other possible reasons why we were being targeted for attack by Ragnaros. Thus, KTM played a role as a temporary actor within this raid encounter. KTM was used to diagnose problems, not to actually alert us of threat level dangers throughout the fight. Once we figured out that threat wasn't the problem, we essentially no longer needed KTM for the Ragnaros fight.

Discussion

Actor-network theory is an attempt to describe how an arrangement of objects in a network are acting on others and are acted upon by others so that the activity does what it does. It tells a story about practice within situated contexts, involving historically-based interrelated actors. At the basic level, this network ANT describes is an assemblage of parts, but it is also dynamic. This dynamism is what makes it a mangle with vying

interests and constantly renegotiated relationships and distributions of responsibilities. The reassembling occurs across multiple layers of complexity and multiple timescales.

On the surface level, the whole landscape of *World of Warcraft* play was determined by designed constraints from the game developers, who were, in turn, affected by the historical evolution of MMOG play. Digging deep, individual players assemble and arrange the objects and resources in their specific in-room, on-screen settings. KTM is just one of these objects.

Between the work that occurred on the surface level and the deeper individual player level lays the mangle that Steinkuehler (2006) wrote about: a messy set of practices emerging from the constant clash and negotiation between the designed experience, players' exploration and meaning-making in that experience, and all the ways in which various parties exploit, modify, and change the system. In the larger WoW community, KTM and other player-created add-ons that helped raids manage raiding was becoming so normative that Blizzard Entertainment was forced to incorporate many of their user interface tweaks into future iterations of the base game.

My raid group and its activity across the locations in which it assembled represent one tiny sub-mess—a microcosm of the mangle—and yet this small mess could be broken down further. Each character class was grouped together and those groups independently assigned internal roles and responsibilities, engaged in scientific argumentation about strategies and tactics with a larger class-based WoW community. Furthermore, as stated earlier, each player had his or her own local configuration to manage. Just as Stevens, Satwitcz, and McCarthy found with their young gamers (2008), these arrangements would sometimes extend beyond the computer screen and into the

room. I personally distributed bits of info onto sticky notes on my desk to help me remember, for example, how much fire resistance I should have.

The existence of networks within networks is something Latour spoke of when he described the anatomy of a door-closer (1988), but as Lemke (2000) notes, different measurement scales can be used to look at time in addition to size.

KTM was designed by a player in Europe within an emerging community of WoW players that engaged in *theorycraft*—scientific modeling of character designs and player activities to test out hypothesis on the most efficient combinations. He then released it to the larger WoW community. Specific to my raiding experience, the use of KTM started off in one raid zone with one group of players who were a sub-group of the larger Molten Core raid group. Its use then migrated over to MC. It took about two months for the diffusion of KTM to reach some sort of critical point of usage so that it was accurate enough to help raiders keep track of threat and predict aggro gains. This was slow, at first, because its effectiveness was difficult to demonstrate without enough people using it to begin with. Partly, it was the situated knowledge problem of trying to describe a bicycle to a fish (Bransford, Brown, & Cocking, 2000). The very idea of a bar chart showing threat level was completely new to some players. Roger and most of the rest of the rogues had the misconception that threat level wasn't additive, for example.

In a given week, such as the week of April 28, 2006, we can see how the rogue class group used KTM to diagnose problems with Ragnaros. Not all the rogues had KTM installed, but enough had installed it to start to see that threat wasn't the problem with gaining aggro in that particular fight. This diagnosis was actually done on a single night across multiple attempts at confronting Ragnaros. Each attempt lasted about 6 minutes

plus about 20 minutes of pre-planning and post-debriefing—time reserved for reflective thought (as opposed to experiential thought) that helped us learn (Bransford, Brown, & Cocking, 2000; Norman, 1993).

Each attempt can be looked at using a scale of seconds identifying specific chat utterances that show changes in conceptual thought about how to successfully fight Ragnaros. These individual utterances, sporadically spread out over a single attempt and even more sporadically spread across multiple attempts, occurred on multiple communication levels, interwoven between the rogue chat channel and the larger general raid group chat channel.

The actual practice we were engaged in was informed by a raiding tradition in the MMOG genre that spanned at least a decade (e.g., raiding in *EverQuest*). The instantiated version in WoW was affected by players' understanding of the particular mechanics of WoW raiding, but this was affected by what players knew about general WoW encounters, which they learned after months of leveling up and participating in smaller player groups. All these different levels and timescales of experience serve to position and frame future work of individual actors *and* groups.

Conclusion

The enrollment of KTM into this raid group's standard practice brings up a number of issues. First, though it was nominally being incorporated to an existing network, it took on a sort of agency itself by imposing new responsibilities to the other actors in the network (e.g., it shifted communication patterns, it drove changes in strategy).

KTM, on a micro level, required us to give it attention and then adjust our behavior based on what it displayed. It did not care, of course, whether we actually changed our behavior, and neither did it enforce its use. Yet, by being a transparent tool, showing everyone's threat level to all players, it did not need to enforce its use. We did that on our own. This is both good and bad. Its benefit was clear: some of the players appreciated being reminded by others to be cautious about their threat level. Yet this came with a price. While KTM served as a threat meter add-on to warn us of impending aggro change, it also served as a surveillance tool that we could use to make sure each of us was playing efficiently to help the common task. What used to be monitored individually had become distributed to the collective, making it as open as Thomas More's houses in *Utopia* and as transparent as Bentham's Panopticon. Furthermore, on a more macro-historical level, KTM helped narrow the legitimate experience of playing *World of Warcraft* by reinforcing the threat paradigm and the tank-healer-DPS tripartite found in MMOG encounters. Playing WoW has consistently become more and more a game of numbers, efficiency, and theorycrafting, buying into the notion that the end goal of playing is to win loot and progress.

The second issue brought to light in analyzing KTM's adoption is the issue of communication levels. The rogues were internally attempting to make sense of Ragnaros's aggro changes, but it was only after Roger voiced his dissonance in the general raid chat channel that the rogues began to understand what was happening. This occurred when Maxwell replied to Roger, letting him know that the melee DPS needed to wait for tanks to be in position before getting in range. Indeed, it seemed like Maxwell, a non-rogue, already knew about Ragnaros's melee targeting preferences. If it is necessary

for group members to make available to others their misconceptions before the group can become aligned or translated to a common understanding, how do individual players become compelled to speak up? The raid assumed character class-specific expertise in all its members. Displaying evidence of a lack of understanding could have been seen as a risky move. What's more, this assumes the rogues could identify and be metacognitive about their lack of understanding and need to elevate their talk from their private rogue channel to the larger raid channel. Yet the onus of opening up appropriate communication channels so the raid could repair itself seemed to be taken up by happenstance through flabbergast and flailing. What do we make of this? In future endeavors or other group work, some way to insure recognition of micro dissonance that needs to be elevated to the whole group would be necessary.

Still, the raid's eventual adoption of a new actor into the network is an example of how local practice is emergent and dynamic and heavily dependent on available technomaterial resources, which are assembled and configured in and around the activity. This example helps us redefine expertise development not as changes in practice, but rather, as changes in how the assemblage is configured, which necessitates the successful negotiation among actors in a network about distributed roles and responsibilities and a shared understanding about the local task at hand. What's more, the shared understanding and the actual roles and responsibilities that need to be distributed also changes over time. The enrollment and translation process reconfigures all involved. The reconfigured network is then stable and successful—that is, until a new disruption occurs.

This is an important insight into group work in both formal and informal educational contexts. Designed curricula, tools, and structures that make up a learning

environment are negotiated with by learners such that the practice of learning and doing emerges from a push-pull relationship that is constantly shifting and being renegotiated over time. Players and learners use available sociomaterial resources, and it is their stable assemblage of these resources—some of which are assigned roles and responsibilities that do not match designed intent—that allows the learners to be successful.

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