How Individuals, Cultures and Tools Learn, Create and Distribute Knowledge in Online Communities

Young people participating in fan fiction forums are learning English as a second language (Black, 2008). Hip hop discourse in online forums might help us engineer financial literacy into learning environments (Devane, 2009). Folks participating in forums for RPG Maker are learning to take and give criticism and develop as game designers (Owens, 2011). More broadly, educational researchers are developing a rather robust understanding of the kinds of skills and knowledge individuals can develop in online communities. As young people move from "hanging out" to "geeking out" in online communities they are Ito suggests they are "learning to navigate esoteric domains of knowledge and practice and participating in communities that traffic in these forms of expertise"(2010, p. 28). In short, educational researchers have developed a good sense of the kinds of things individual young people are learning through their use of online communities.

Comment [1]: Kim Sheridan:
change to "considerable insights into" -- I don't know if we can yet call it "good sense" :)

We are still, however, figuring out how to theorize, study and analyze how learning and knowledge works and comes about in online communities/environments. While we have a good sense of the kinds of things that some people are learning, and the kinds of things some people are doing, in most cases we don't have a particularly sophisticated understanding of exactly how online communities function. Some approaches focus primarily on the experiences of individuals and take the sites and other community members largely as a given or static background for study. In these approaches, one often find discussions of a kind of developmental ladder, in which individuals join and online community and progress from novice understanding of a particular subject up a series of rungs toward expertise. Others kinds of studies, frequently drawing on Levy's ideas of Collective Intelligence, try to look at a snapshot of the range of current activities on a given site as a way to document how knowledge is socially and incrementally constructed, as individuals add to and refine ideas through discussion. In both cases, these approaches often do not draw extensively on ongoing work in anthropology which has been focused on refining how we think about studying computer mediated communication as a designed technological artifact and a site and an ethnographic field site. While there is a considerable amount of exciting and groundbreaking work exploring learning and knowing on the web, there is a need to be a bit more synthetic in terms of understanding the roles of individuals, technologies, and cultures.

Through our experience studying online communities we have come to believe that we can't really understand what individual learning and development means in these spaces without respecting and exploring what learning (knowledge creation) and the assemblage of software that enables online communities. We, like many of those studying learning in online communities, see learning and knowledge through from a related set of socio-cultural perspectives. In particular, in keeping with Cultural Historical

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wording is off here

Activity Theory, that learning and knowledge are fundamentally social and distributed things that emerge through individuals interactions with each other and the world over time. Similarly, in keeping with Symbolic Interactionist thinking, that learning as cultural activity is rooted in our use, negotiation and interpretation of exchanged communications in symbol systems. These perspectives undergird our approach, and strengthen our resolve that individuals, collective knowledge and the technical structures that enable interaction should be attended to.

In this essay we present a particular episode of learning in an online community. A individual who learns the programing language Ruby. In piecing together his personal history through a range of ethnographic data we hope to offer the beginnings of a framework that approaches learning and knowledge in online communities.

Mr. Bubble learns to code on RPGmakervx.net

In 2009 I began a qualitative research project on RPGmakervx.net, an online community which functions through a set of web forums. In these forums, anyone interested in building role playing video games with the RPG Maker VX software can find resources for creating games (music, artwork, snippets of code), tutorials for using the RPG Maker software, and a place to get feedback and guidance on the games they are creating. To get a few different vectors to understand the community I designed and conducted a member survey which I then used to select a diverse sample of individuals (different levels of experience, different areas of interest, etc) from the community to interview. Alongside the interviews I then explored their participation in the RPGmakerVX.net discussion boards. I coupled these investigations of individuals with a broader study of the structure, organization and process of interaction on the discussion boards.

I've published on the general structure and organization of the site (Owens, 2011) and a more detailed case study of one individual learners development of a game (Owens, in press). While the goal of this project had always been to understand what and how individuals learn and develop particular skills and knowledge, understanding those things kept increasingly requiring me to think more about not only how the individuals were changing and developing but how they were both changing and developing the community itself, and how their contributions, the things they created and built, were in turn changing each others interactions. These distinctions are best understood through a detailed reconstruction of one participant, who goes by the handle Mr. Bubble's episode of engagement with the site.

Mr. Bubble is the handle of a then 24 year old young man from the Pacific Northwest. He turned up in the original sample of 160 members of the RPG Maker VX site that I contacted as part of the survey. I selected him for an interview because of his high level of experience. He reported being involved in the site for more than a year, having read many tutorials, posted feedback on many tutorials and having written several tutorials. He reported posting messages on the boards several times a day. He

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I'm wondering if we want to include symbolic interactionism in an "essay" length piece. The reason I wanted to include it is that it highlights that individuals in social settings each individually construct the meanings of the setting through social interaction, and that some of the sites infrastructures are "signifiers" of that interaction. But it's a theoretical framework that carries baggage with it and may take more time than we want to use to clarify HOW we think it's relevant. We could just elaborate on CHAT more and let SI lie. --Engestrom--one of the key developers of activity theory was a core SI person so much of what is relevant in SI is in activity theory.

Trevor Owens:
That makes sense to me. We can drop the SI bit and focus on the CHAT part. As you mention, the latter sorta comes with the former and if we aren't relying heavily on SI in analysis/implications there isn't much need to bring it into play.

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or "theoretical paper"

also had a considerable amount of experience and involvement, but like many members, despite his extensive experience, he had not completed a game. After pulling up his profile, I saw that he was extensively involved in the Ruby Scripting part of the site. Briefly, RPG Maker VX is mostly a point and click game making program. With that said, it has a rather powerful and open ended set of capabilities for users to write their own scripts. It uses the rather popular Ruby programing language. Wanting to make sure that I worked with someone who was engaged in this part of the site I reached out to interview him. I thought this was important for understanding the different kinds of production that it looked like were happening in this community, but also as something like learning to code in Ruby is such a clearly valued skill that if I did find examples of individuals learning this skill in the community there would be no need to think about how that skill might transfer. Learning Ruby would be a clearly recognized achievement enough.

It turned out that Mr. Bubble had both learned Ruby and developed self-efficacy to see himself as a programer through participation in the RPG Maker VX community. With that said, sequencing his experiences that resulted in this learning outcome suggest an intricate series of factors that resulted in this learning outcome. Building a composite of the sequence of events as he understood them (based on an interview and a reflective blog post he had written) and largely substantiated by records of his activity in the discussion boards, the following sequence of events emerges. We will lay this sequence out and then work through a few different ways of interpreting and understanding it.

Learning of and Exploring RPG Maker VX

Mr. Bubble first heard about RPG Maker from his brother, who several years earlier had downloaded and played *Sensible Erection,* an irreverent game created on an earlier version of the RPG Maker software. His brother then dabbled a bit with RPG Maker XP, the direct predecessor to RPG Maker VX. These experiences exposed him to the possibility of creating a game with the system.

A few years latter, in the summer of 2008, Mr. Bubble downloaded and started experimenting with RPG Maker VX. By his own description, there were several properties of RPG Maker VX that made it particularly appealing. Namely, several of the aesthetic qualities of the platform, including the sprite color palette (sprites are the animated game characters) and the "high quality face sets created by Fumio Minagawa" acted as what Mr. Bubble referred to as "the spark of interest that has lasted until now." Both of these features, the sprite colors and the face sets, appeal to the style and design of popular super nintendo japanese role playing games (JRPGs). Fumio Minagawa, is an artist particularly well known for his work on several JRPGs. Not simply a place of origin, there is a style and aesthetic to JRPGs and the RPG Maker application is built to make it easy for players of those games to make games that have those characteristics.

When asked about his favorite games in the survey, Mr Bubble's top two games *Tales of Destiny: Director's Cut* and *Tales of Vesperia,* are both JRPGs that fit very much at the center of this genre. This illustrates the connection between the kinds of games he likes to play and the kind of games that RPG Maker VX was specifically created to make it easy for users to create. Bubble found out about the existence of RPG Maker when he found one of the games someone had created with it and he started working with it and kept working with it because it appealed and matched his tastes. One might expect that he would then go about designing and creating a game with it, but instead of building a game he went on a bit of a different path.

Becoming interested in using Scripts

Another property of RPG Maker played the next role. In his own words, the RPG Maker VX "battle system was quite lackluster." In keeping with many tropes of role playing games, by default, RPG Maker VX games involve a lot of battles with randomly encountered monsters. As a player is walking around in the world they run into monsters and shift to a view where they see a monster or monsters displayed on the screen. Each attack a player character makes results in an animation, but players only see the animations of the monster they are fighting and not their characters doing the fighting. For those familiar with Role Playing Games, the battles work more or less just like battles in the *Dragon Warrior* NES games. The problem is that the RPG Maker VX users frequently want to see their characters in battle. This desire is evident in the numerous popular scripts that change the battle system.

What Bubble described as the "lackluster" battle system led him to explore the various battle scripts that had been created. In his words, he began "hunting up" whatever script he "thought was cool to add into my game." Finding these scripts is contingent on a set of online community sites/discussion boards, of which RPGmakerVX.net has become the most prominent, where individuals share these kinds of resources. It is also dependent on a range of other individuals producing, sharing, and creating documentation and tutorials on how to use those scripts. Importantly, the capability to use scripts itself is predicated on a particular set of design decisions including, letting users write scripts, which were greatly expanded in the VX edition of RPG Maker, and the fact that the scripting system itself use Ruby, an Object Oriented Programing language which was created in Japan but is quite popular in a range of different web development situations.

Over the course of Mr. Bubble's explorations of scripts he came across the Tankentai Sideview Battle System. Tankentai itself had a set of properties that made it particularly appealing to Mr. Bubble. In his words, "I think my first experience with Tankentai was like what most people felt; it was side view, it had moving actor and enemy sprites, and it wasn't the default battle system. I had to use it." It is worth noting that these features, side view & moving sprites are signature features of many of what Mr. Bubble had identified as his favorite games. It is also the style of the Final Fantasy

games which Fumio Minagawa and worked on art for. Bubble (like many other users) wanted to be involved in making games like the games he loved and Tankentai was what was going to let him do that.

From using scripts to fixing scripts

Getting to use the Tankentai script took a good bit of study. He remembers spending several days to work through the different functions and capabilities of the script and then several weeks to get a particularly solid sense of the kinds of things that were possible with it. Ruby is a programing language that runs as uncompiled code, that is, the code you write in text is the code that runs. This makes it easy for other users to use your code and it also results in the code itself including information for people to read, information in plain text, that describes how to use it. The comments in the code work to explain how it works and to teach a user how to work with it.

From his initial tinkering with the script Bubble could see that the translation was quite bad. Tankentai was originally written by a Japanese RPG Maker VX user, who goes by Enu and was then translated into english by a RPG Maker VX user named Kylock. As an example of issues in the translation, one of the problems Bubble saw was that the variable for setting the wait time for an object was translated as "OBJ_ANIM_WEIGHT" when it should have been "OBJ_ANIM_WAIT." These kinds of clear, but minor, problems invited Mr. Bubble to start tinkering with the code for this script & encouraged him to go and "check out the original Tankentai script comments".

The problems in the translation were a kind of invitation. While the aesthetic characteristics of RPG Maker VX like the face sets and the sprite color pallet were appealing to bubble, the limitations of RPG Maker VX were equally important at creating the learning opportunity for him. Ultimately, the lackluster battle system and the possibilities of scripting on the platform invited many of the community members to work on and develop their skills at creating their own battle systems. One of those systems, Tankentai, was particularly appealing to Bubble and the problems in the translation of that script gave him the opportunity to edit it. The clear problem in the translation prompted him to take the first step from being its user to its maintainer.

As Bubble was beginning to tinker with Tankentai, Kylock, who had worked on and maintained the english translation "had become less and less involved with helping other users." This created an opportunity for someone else to step in. This was particularly important as Enu, the creator of the original Japanese version of the script, "was still actively updating his script and a proper english update was not being delivered to users." With the help of online resources for Japanese translation and his “out of practice Japanese from high school” Bubble was "able to better interpret most of Sideview's configuration script and also translate most of the script that was a still left in Japanese.” He went to put considerable amounts of time into refining the translation and then contacted Kyrlock privately through the online discussion boards to offer to step in to maintain the translation.

Becoming the maintainer of TSBS

The discussion thread of the finished Tankentai script on the RPGmakerVX.net discussion board has recieved more than 3,400 replies. Now four years after Mr. Bubble started this thread it is almost always on the first page or two of threads in the completed scripts section of the boards. That is, every few days users are responding and reporting bugs or asking for help. If you read through the discussion thread you find people reporting bugs and issues and those issues being dealt with and in some cases resulting in fixes to the code. At points in time Enu, the original author of the Japanese script has made fixes and Mr. Bubble has worked with others on the discussion boards to incorporate his fixes.

Over time working with the script Mr. Bubble gained a better understanding of the script which "allowed me to improve comments that even the Japanese version did not explain thoroughly". This is to say, he went from being a translator from japanese to explaining the functionality of the script based on his decoding of the Ruby code it self. Mr. Bubble's lack of extensive Japanese language skills meant that he could get help from someone with more extensive translation skills, which he gets from Rpgrevolution.com user Shu, who translates the most difficult parts. Bugs are reported by various RPG Maker VX users on online discussion boards. with help from VX community members Moonlight, Mithran, CrimsonSeas, and AlphaWhelp the "core engine script was stabilized and major bugs were eliminated." As Bubble took on the responsibility for maintaining the script he moved from a user to a contributor. Importantly, most of the learning that mattered in this story resulted in Bubble taking on responsibilities in the online community. He seized an opportunity to commit to work and in the process learned a considerable amount.

What Bubble Learned

As self reflection and metacognition are themselves essential components of learning, it is worth presenting in his own words, what Bubble feels he has learned. The following comes from a blog post that he published in February of 2010 after he had responded to the survey but before we had begun interviews.

> I know what the Side view is capable of. I know what the limitations of the Sideview script are. I'm able to produce an algorithm of battler actions within my head and translate it into an action sequence, or "Tankentai coding" if you will. I'm able to read another person's battler action algorithm and determine whether it is possible to produce within the Sideveiw configuration. It's just something that I learned from playing with the script for so long.

In short, Bubble had developed a considerable understanding of this particular script, and in the process, familiarity with the underlying way that Ruby scripts work. He thanks a series of other RPG Maker VX users, Moonlight, Mithran, Yanfly and Enu who "inspired me to formally learn programing (finally!). There is no chance I'll be anywhere close to their current skill level within the next year, but I love learning." Bubble has self-efficacy, he sees himself as someone who can program, and he has refined his skills through his participation in the community.

What the Community Got

A commenter notes "Big thanks! If you hadn't translated it. Most RMVX users would have given up on RMVX." Bubble demures from this, noting that there are a lot of other scripts for this sort of thing and that if he hadn't done this it is likely that someone else would have. However, this points to a larger issue in this situation. Mr Bubble's learning was possible because of the current state of the online community, the software, and the entire ecosystem of scripts, scripters, and users.

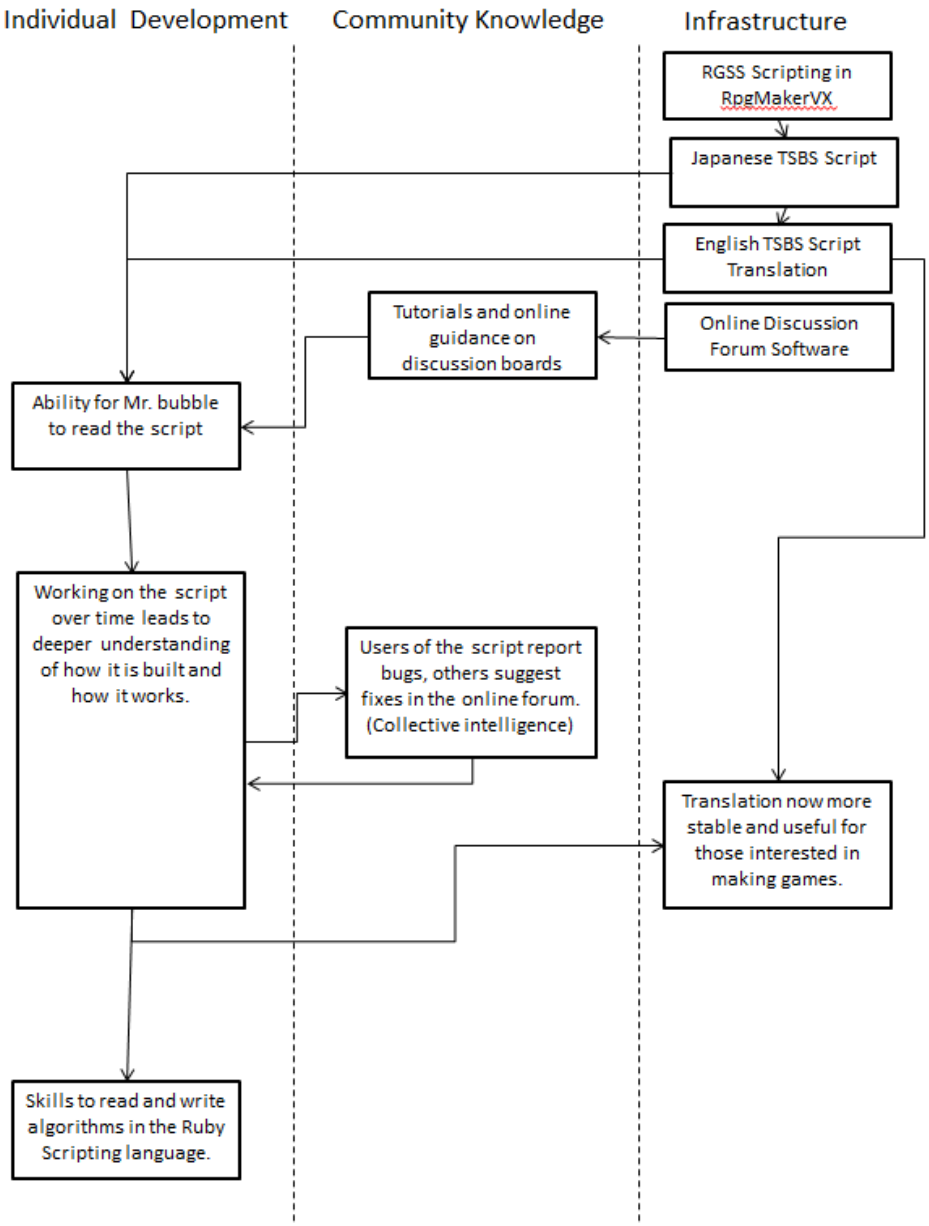
The sequencing activity illustrates the contingent nature of Bubble's engagement, both in terms of the contingency of the outcomes on the particular people and objects but also the configuration of those people and objects at any given state. For example, it matters a lot that his brother introduced him to an earlier version of the software, that Kylock stopped wanting to maintain the script at a moment when Bubble could step in. Similarly, the state of the various objects matters a lot.

Particular properties of RPG Maker VX, its script-ability, were pre-requisites, but so were some of the particular aesthetic components of how the default artwork was designed. Ultimately, both the features of Tankentai Sideview Battle System (which were particularly appealing because they fit with the design elements of some of Bubble's favorite japanese RPGs) and the clearly obvious defects in the translation of the script, were necessary components of the script that resulted in him taking on the maintenance of it. Ultimately, while learning a range of things related to programing and software development, by helping to stabilize the Tankentai system Bubble changes the RPG Maker VX ecosystem. As one of the most popular scripts, the successful functioning of this system is a key component in the ability of a range of users to create games that play off of the RPG tropes that so many want to see in their games. In short, Bubble learns as a result of interaction with the ecosystem of people and objects and in the process also makes significant changes to that ecosystem that both creates and closes particular opportunities for individuals learning.

His individual development is contingent on the community knowledge made possible by the online discussion board software and the underlying technical infrastructure of both the RPG Maker VX application, and the existing scripts. Importantly, his learning does not simply make use of that community knowledge and infrastructure, it actually adds to and changes that underlying infrastructure. The particular learning opportunities presented by problems in the translation of the script

could only be used once. What made them meaningful was that they were part of solving a problem for a community. With that said, his actions undoubtedly created new opportunities for learning in what people have continued to do with his script.

To illustrate these interrelationships I have included a diagram that abstracts some of the movement between his individual development, the kinds of community knowledge and collective intelligence he draw from and contributed to and the underlying infrastructure that scaffolded him into the learning opportunity but was itself also altered through his contributions.


Individual Development
Community Knowledge
Infrastructure
RGSS Scripting in RpgMakerVX
Japanese TSBS Script
English TSBS Script Translation
Tutorials and online guidance on discussion boards
Online Discussion Forum Software
Ability for Mr. bubble to read the script
Working on the script over time leads to deeper understanding of how it is built and how it works.
Users of the script report bugs, others suggest fixes in the online forum. (Collective intelligence)
Translation now more stable and useful for those interested in making games.
Skills to read and write algorithms in the Ruby Scripting language.

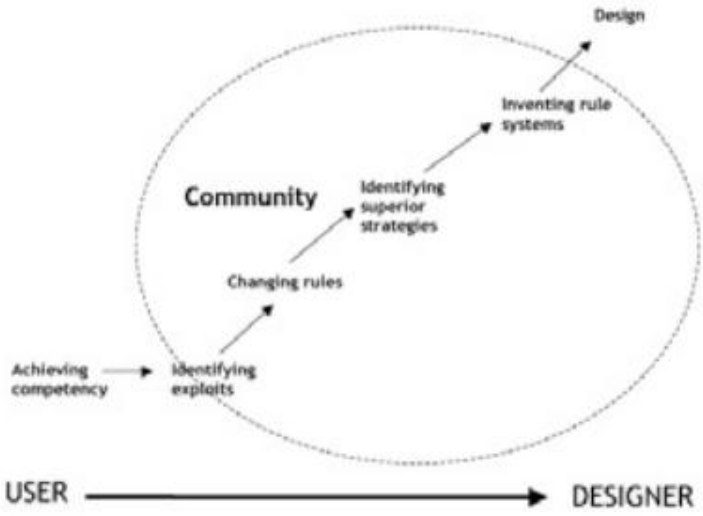
Making Sense of Mr. Bubble, RPG Maker VX and RPGmakerVX.net

This story fits in with three different ways of thinking about and studying learning and knowledge in online communities. The remainder of this paper works through how this story fits into and complicates thinking about individual learning in online communities, studying collective intelligence, and attending to the particular affordances of the assemblages of software and other underlying technologies that are loosely joined to support and sustain online communities. In talking through this case in each of these perspectives we hope to work out a more synthetic way of theorizing and studying learning and knowledge creation in online communities.

Individual's Learning in Online Communities

Much of the work on "Affinity Spaces" and "New Literacies" is focused on identifying individual's learning and learning trajectories in online communities. For example, Black's work on ELL students who participate in online fanfiction communities suggests that those participating students develop both skills and confidence in their use of the english language through writing and reviewing each other's writing (2008). Similarly, Squire and Giovanetto's study of the Civilization modding community, Apolyton University, documents the process by which individuals engage with community members, develop skills, and ultimately develop expertise in game design (2008). In both of these cases, the stories are primarily about individual development, taking the background of the community as a given.

Squire and Giovanetto's chart of Typical trajectory of player experience is typical of this kind of the result of this kind of approach. The chart identifies particular rungs on the learning ladder and notes how those are generally experienced by players.



These approaches are very similar to Ito's ideas about online communities. She suggests that individuals begin engagement in these web communities through what she calls "messing around". In this early period of their engagement with a new web community, individuals are just dabbling with web communities that pique their interest. Ito's research suggests that through interactions with community members, many individuals move into a more involved stage that she refers to as "geeking" out. In this phase, individuals delve much more extensively into the kinds of work occurring in these communities.

In broad strokes, Mr. Bubble's story fits in with this narrative. He started messing around with RPG Maker, and moved on to geeking out. The ultimate result of his geeking out was the knowledge he acquired about Ruby, about programing, about managing a software project. This narrative and framework works as an existence proof, his geeking out got him that knowledge. However, the details of what exactly that geeking out involved and the other results of his engagement in the online community aren't substantively explained through a primary focus on his individual development. So much of his learning is actually contingent on the needs he saw in the community, his ability to make a contribution and the approach does little to attend to the fact that his learning opportunities were contingent on the opportunities that were available as the result of other's work evident in both the collective knowledge of the site and the changes he made to the Tankentai script itself.

This case suggests that the study of individual learners and the development of their learning is likely to be highly contingent on the state of the community at the time they begin engaging. Unlike schools, online communities do not follow a calendar or a curriculum. Learning is a byproduct of production, not the goal itself. As a result the communities themselves are always going to be in a state of flux. Importantly, the Squire and Giovanetto study does recognize this to an extent, the particular community they studied was tied to a group of individuals learning to work with Civilization III. In the sites third year there was a considerably smaller amount of member participation.

A generic trajectory for learning on RPGmakerVX.net is problematic. Some users come in and learn to design games, some find it rewarding to work on creating artwork or music for other people to use in their games, some spend time writing tutorials on how to use particular scripts, others, like Mr. Bubble, become focused on writing and improving scripts for others to use. Still others take on roles as moderators who help maintain norms for discussion. The site isn't a learning assembly line (a metaphor that I think works as a good stand in for how schools are imagined) where learners are put in and advanced through grades and at the end leave with particular competencies. Online communities are more like Learning Beaver Dams or Beehives. Different individual beavers or bees play distinct individual roles in sustaining and maintaining the structure and culture of the community which is produced and sustained by their work and contributions. Each beaver and bee becomes a part of the system and changes it a little

bit. Which leads to a related approach to talking about online communities as collective intelligence.

Collective Intelligence and Emergent Knowledge Production

The characteristics of web forums and other online asynchronous discussion spaces serve an interestingly distinct function. Along with enabling discussion, those discussions themselves become searchable repositories of knowledge and information. Pierre Levy (1997) has conceptualized these kinds of discursive spaces as a form of collective intelligence. In this view, the web contains a shared and common pool of knowledge that is collectively produced and consumed. Levy's concept of Collective Intelligence proposes that readers, spectators, producers, creators, and their respective interpretations are blending into a reading-writing continuum. Levy (1997) suggests that this continuum "will extend from the machine and network designers to the ultimate recipient, each helping to sustain the activities of the others" (p. 28). From this perspective the product (the game), the process (discussion on the boards), and the learning are all part of a distributed network in the reading-writing continuum.

Henry Jenkins has applied these ideas to fan communities. "On-line fan communities might well be some of the most fully realized versions of Levy's cosmopedia, expansive self-organizing groups focused around the collective production, debate, and circulation of meanings, interpretations, and fantasies in response to various artifacts of contemporary popular culture." (2002)These ideas have similarly been applied to study informal learning in online communities.

For example, in a study of discussion threads in the *World of Warcraft* forums, Steinkuehler and Duncan (2008) found that beyond serving as a space for discussion, the threads also served as a knowledge base. Drawing on Levy's idea of Collective Intelligence, the authors suggested that the discourse and dialogue between these gamers became a body of collective information that was then consulted by other players as a resource. Steinkuehler and Duncan suggest that the collaborative construction of knowledge in *Warcraft* forums parallels the kind of collaborative construction of knowledge that occurs in scientific communities. By looking at the arguments that players engage in about how to best use resources in the game, Steinkuehler and Duncan document the sophistication of argumentation in this space and also suggest that beyond simply documenting discourse the discussions themselves become resources that other players draw from to make decisions.

These approaches do a great job at getting at that beehive or beaver dam like quality of online communities. People interact, people participate, and the results are this emergent production of knowledge and this opportunity to learn. This does a great job in serving as a framework for thinking about what is happening on RPGmakerVX.net. People making things, people having discussions, people discussing things, and all parts of this network resulting in new resources that get used by other people.

WIth this said, one of the biggest limitations of projects, like Steinkuehler and Duncan's is that they generally capture and pick apart particular moments in time as recorded in online communities. In their case, they focus their analysis on the threaded discussions. Because they didn't survey or interview the people involved in those discussions we don't really know much about who they were. Are they young people and is this their first exposure to these ways of thinking? Or, are they scientists, engineers, computer programmers who spend their nights engaging in a hobby? Without a focus on particular individuals trajectories of engagement and participation we don't really gain insight into what someone is learning, we get a sense of the kinds knowledge that is created and how it is mobilized throughout the community but we don't really learn much about what people are actually learning if we aren't directly engaging with them. As such, collective intelligence is a powerful way for accounting for the interactive and participatory nature of online communities, but if and when we want to study learning, particularly learning of young people, researchers need to be interacting and collecting evidence through interaction with participants.

Together, the attending to individual learners experience and understanding and documenting and wrestling with the ways that the emergent nature of collective intelligence happens gets us thinking about the two sides of the coin that are necessary for understanding Mr. Bubble's case. With that said, neither necessarily gets us particularly deep into the part of the story that has to do with infrastructure. Yes, collective intelligence emerges, but aside from individuals participation it is also emerging out of the materiality of the assemblage of software and hardware that makes possible our participation in the communities.

Affordances of Particular Community Designs and assemblages of technologies:

The web is not a place. The web is a technology. More specifically, the web is an assemblage of technologies. Ten years ago it was common to talk about cyberspace. As the web has become a part of our everyday experience the term has gone out of vogue. The web is not virtual, it is a thing. This has been a substantive part of discussions of doing qualitative research among internet researchers more broadly, but hasn't been nearly as present in the work of those studying digital media and learning.

One of Hine's key points of comment in *Virtual Ethnography* is a discussion of the Internet as both a culture and a cultural artifact (2000). The key insight here is that the web is itself a technology, one that is designed and has particular features and goals and one that could have been designed differently. It is not a natural setting, it is a designed technological platform and thus studying culture on the web is also studying the technology that affords the experiences of the web. With this said, both the Culture of the Internet and the Cultural Artefact of the Internet feel far too monolithic in these statements. The Internet is a multitude of technologies assembled together in different arrangements and those platforms support and sustain distinct and different cultures.

In *The Internet, An Ethnographic Approach*, Miller & Statler attend to some of these issues in a more nuanced fashion (2001). Their focus is on thinking about the Internet as a communication technology that mediates communication. In their words;

> A central aspect of understanding the dynamics of mediation is to 'disaggregate' the Internet; not to look at a monolithic medium called 'the Internet," but rather at a range of practices, software and hardware technologies, modes of representation and interaction that may or may not be interrelated by participants, machines or programs (indeed they may not all take place at a computer). What we were observing was not so much people's use of 'the Internet' but rather how they assembled various technical possibilities that added up to *their* Internet. (14)

Setting aside the monolithic idea of the Internet, we find here is a more nuanced understanding of how people make use of the affordances of given sets of technologies to learn or create knowledge. That is, this approach gives us a concrete way to talk about the infrastructure that enables the kinds of emergent learning and knowledge creation that happens on the web. In keeping with this approaches, studying the particular kinds of software that different sites run is likely to give us a deeper understanding of the affordances of individual assemblages of these technologies.

From this perspective it becomes possible to think about how particular designs of community sites afford particular possibilities for participation. As an example of this approach, sociologist Felicia Wu Song asks of a range of different website structures and designs in *Virtual Communities* (2009). Song focuses on virtual communities as various websites that enable public interaction and discussion between users. The 30 virtual communities analyzed to develop this book include many popular online community websites, including sites like Beliefenet, iVillage, Slashdot, Craigslist and Meetup.com. Song is particularly interested in the "democratic potential" (p.47) of these virtual communities. In an attempt to assess this, much of her analysis focuses on the extent to which these sites provide autonomy to users and enact control. Song offers an interesting take on using qualitative methods to study virtual communities. In her words, the goal of the book is to explore "the design and implementation of virtual communities" (p.9). What is essential in this case is that while we might want to treat online communities as "naturalistic" environments, they are in fact always designed environments. While each user makes sense of their own participation that participation is structured through a set of technologies designed to get them to participate in particular ways.

Kozinets, *Netnography: Doing Ethnographic Research Online (2010)* offers some of the most well developed and balanced ways for thinking about how to attend to these issues. One of Kozinets best contributions to this discussion is the notion of "computer mediated fieldwork" in his conception, researchers still need to do ethnographic field

work, they need to do “participant observation” but they need to do so while understanding that the nature of interaction and of their data collection comes through a communications technology. He calls this “alteration” which means “the nature of the interaction is altered—both constrained and liberated—by the specific nature and rules of the technological medium in which it is carried.” (68) Kozinets discusses three types of data archival data, data copied from “pre-existing computer-mediated communications of online community members” elicited data which is co-created with “culture members through personal and communal interaction” and field note data, the researchers own notes and observations. He suggests that this is similar to Wolcott’s “watching, asking and examining” and Miles and Huberman’s “documents, interviews and observations.” Together, these three kinds of data are likely to capture enough of the engagement and interaction of individuals while still documenting the ebb and flow of communication and interaction to enable a researcher to attend to individual development while getting a sense of the generative nature of the knowledge creation and allowing a researcher to think through how the particular structure of the site’s software is structuring that participation.

Conclusions

Research on learning and knowledge creation on the web has blossomed in the last ten years. We are now at a point where we can shift away from doing existence proofs that learning happens on the web, something I would suggest is emblematic of much of the work that has focused on individual’s development. SImilarly, there is a need to move away from the high theory of collective intelligence and the great cosmopedia of writing, rewriting, making and learning and get down to the concrete and detailed exploration of what exactly people are doing in particular contexts.

This is to suggest that we have a solid set of ways for thinking about individuals learning and the way that emergent knowledge happens on the web, but we suggest that going forward studies of learning in online communities should explicitly attend to both the experiences of individuals and the emergent properties that happen with the particular assemblages of technologies in play that enable and structure participation. What is essential for understanding Mr. Moo’s case, and what we think is likely more generally the case is that learners are not the only things that change over time. The productive nature of online communities means that each learners work changes the environment, it creates new resources for other learners and knew discourse that can be marshaled and organized as part of collective intelligence. By triangulating observations, interviews, and study of pre-existing archival data it is possible to reconstruct the history of individual learners and the history of the communities themselves. In so doing, we can understand both the experiences of individuals and the structures that enable and result from their experiences.

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