From *Taste of Home* to *Bullipedia*: Collaboration, motivations and trust

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Abstract / Résumé

*Bullipedia*, the online gastronomic encyclopedia, is an idea yet to be developed. In this work, we analyze a community formed around a food magazine, *Taste of Home* (ToH), and extract some good practices to incorporate them to the future *Bullipedia*.

ToH is a recipe exchange magazine specialized in Midwestern cuisine. Its recipes are reliable as they are from home cooks and tested by ToH’s professional chefs. This model of user created content (curated by culinary experts) generates trust and a strong sense of community among like-minded people who share food preparation tips and anecdotes. In this paper, we present a study on the interaction network of ToH community in order to understand major motivators for its members to contribute.

In our approach, we analyzed the ToH community through its social network on Facebook. Firstly, we selected a subset of users that posted on ToH's timeline. Then, we created connections between two users when one of them commented on the other's post. Finally, we extracted the topology of the social network and identified the main nodes. Our key finding is that this community is very poorly structured and hierarchical, and that ToH is placed in a central position, which gives it full control of all flow of information in the network.

The fact above is important for a magazine whose business model is based on advertising, as it ensures its users always have to visit its own sources of information. We propose to adopt such demonstrated successful model to the *Bullipedia*.

*Bullipedia*, l'encyclopédie gastronomique en ligne, est une idée qui reste encore à développer. Dans cet article, nous avons analysé une collectivité qui s'est formée autour d'une revue culinaire, *Taste of Home* (ToH), et en avons extrait quelques bonnes pratiques afin de les incorporer à la future *Bullipedia*.

ToH est une revue d'échange de recettes spécialisée dans la cuisine du Midwest. Ses recettes sont dignes de confiance car elles proviennent de cuisiniers et cuisinières maison et ont été testées par les chefs professionnels de ToH. Ce modèle de contenu créé par l'utilisateur (et organisé par des experts culinaires) inspire la confiance ainsi qu'un solide sentiment de communauté parmi des personnes qui ont les mêmes aspirations et qui partagent des conseils et des anecdotes sur la préparation des repas. Dans ce document, nous présentons une étude sur le réseau d'interaction de la collectivité ToH afin de comprendre les principaux moteurs de contribution de ses membres.

Dans notre approche, nous avons analysé la collectivité ToH par l'entremise de son réseau social dans Facebook. D'abord, nous avons choisi un sous-ensemble d'utilisateurs qui ont affiché sur la page de ToH. Ensuite, nous avons créé des liaisons entre deux utilisateurs lorsque l'un a commenté l'affichage de l'autre. Enfin, nous avons extrait la topologie du réseau social et avons identifié les principaux nœuds. Selon nos principales constatations, cette collectivité manque totalement de structure et est très hiérarchisée, et ToH se trouve dans une position centrale, ce qui lui donne le plein contrôle du flux des informations du réseau. Le fait ci-dessus est important pour une revue dont le modèle d'entreprise est fondé sur la publicité, car cela garantit que ses utilisateurs doivent toujours visiter ses propres sources d'information. Nous proposons d'adopter un tel modèle de réussite éprouvé pour *Bullipedia*.

Keywords / Mots Clés

*Taste of Home*, Facebook, cuisine, recipe, user-generated content, social network analysis, community, trust, collaboration, *Bullipedia*
Introduction

eBulli, voted the best restaurant in the world in 2002 and from 2006 to 2009 by industry authority Restaurant magazine (Williams 2012), has now become a foundation, eBulliFoundation, that seeks to be a center for creativity and innovation in high cuisine. eBulliFoundation incorporates disciplines such as technology, science, philosophy, and the arts in its research, and publishes its results in international conferences, books or journal articles, in a way similar to the academic process of peer review.

Ferran Adrià, eBulliFoundation's owner, is aware of the value of the knowledge created at his institution, and he intends to continue this creative activity at eBulliFoundation by externalizing its wisdom onto the Bullipedia, his vision for “an online database that will contain every piece of gastronomic knowledge ever gathered” (Williams 2012). He justified the need for such a culinary encyclopedia with the reason that “there is no a clear codification on cuisine.” However, the Bullipedia is an idea yet to be developed. Thus, the question to answer at this point is: "What should the Bullipedia be like?" By analyzing specific literature, interviews with Adrià, newspaper articles, and emails with eBulliFoundation staff, we have identified several requirements that the Bullipedia must meet, from which, in the context of this work, encouraging user participation should be highlighted.

For a project such as this, an online encyclopedia on cuisine, we must stress the participation and collaboration of a large community to build it. On one hand, a number of authors have published research that points out the advantages of crowdsourcing (Sautter and Böhm 2013; Doan et al. 2011). On the other hand, this is an inherently 2.0 project that can harness the collective intelligence and generate value from its users (O’Reilly 2005). So the question now is: How can we engage the community so that the users share their knowledge and collaborate in the creation of content?

Efforts should be focused on rewarding schemas and discovering how to motivate people to share valuable information (Barachini 2009). There are factors that are intrinsically rewarding, such as recognition and reputation (Herzberg 2008). Career advancement and sense of community have been identified as other important incentives (Sharratt 2003). In addition, willingness to collaborate is strongly dependent on the trust level in a community and the value of its information (Krogh et al. 1998; Tsai 2000). In fact, building trust is one of the major motivations for information exchange (Barachini 2009; Krogh et al. 1998). A good understanding of the topic is also a motivation to share knowledge that generates confidence in users (Kalling 2009). The future Bullipedia must adopt solutions that implement these motivators.

In order to solve the problem above, we have analyzed the ToH phenomenon. ToH is a magazine specialized in Midwestern cuisine recipe exchange. It started as a traditional magazine paper but it has now a strong online component and a notable presence on social media. Its fans on Facebook form a growing community worth studying for the construction of the Bullipedia. Firstly, ToH is an interesting case study due to its prosperous career – it has become the highest-circulated food magazine in the world. And secondly, the analysis of its social network on Facebook allows us to understand how their members communicate and to identify motivations for them to collaborate in the community.

This paper is organized as follows. In section 2, we describe ToH, its background and its position in the world, and we justify why ToH is a relevant case for the Bullipedia. In section 3, we introduce two hypotheses necessary for the experiment detailed in section 4. We outline the methodology in section 5. In section 6, we show the results of the experiment, and finally, we discuss the conclusions of this work in section 7.

Case study

ToH was first published in 1993 and currently it has a circulation of 4.6 million subscribers (PR Newswire 2002). In 1964 (PR Newswire 2002), Roy Reiman, ToH creator, started the business in his basement at his home in Greendale (Wisconsin) and created a magazine called Farm Wife News that was “dedicated to partners of the nation's farmers and ranchers” and intended to be “a medium for the exchange of good ideas (Schrambling 2002).” The entrepreneur went on to found Reiman Publication (RP), which published ToH and other satellite magazines: Healthy Cooking, Simple & Delicious, Birds & Blooms, Country, Country Woman, Country Discoveries, Farm & Ranch Living, Crafting Traditions, and Reminisce (PR Newswire 2002).
Today, ToH is composed of recipes from home cooks—not gourmet chefs—that submit them in order to be published. The recipes feature familiar ingredients accompanied by clear, beautiful photos and easy-to-follow instructions (Taste of Home 2014).

ToH's staff do an excellent job of content curation. Each year thousands of home cooks from across the United States and Canada submit more than 40,000 recipes, of which 3,000 are published (Reader's Digest—Trusted Media Brands 2002). First, staff members check an extensive database to be sure they have not been previously printed. Then, they translate readers' letters into deliberately folksy language (Schrambling 2002). Finally, every recipe is tested in the ToH test kitchen to ensure that it can be prepared with affordable, everyday ingredients from regular grocery stores (Reader's Digest—Trusted Media Brands 2002).

ToH's content acquisition and curation strategy results in an interesting case study in controlled content creation. The fact that the readers themselves submit their own recipes makes ToH one of the largest and most successful practitioners of user generated content, as well as a unique barometer of how America really eats. However, professional intervention guarantees credibility and generates trust in the subscribers.

ToH claims that more than simply offering recipes, it fosters a strong and loyal sense of community among like-minded home cooks of all ages, who share food preparation secrets and tips, humorous and heartwarming anecdotes, and glimpses into their kitchens, their homes and their lives (Taste of Home 2014), all for their names and faces in the magazine in return (Schrambling 2002). Regina Schrambling, ex editor and columnist for the New York Times visited Greendale and realized that the families depicted in the magazine's pictures literally reflect its readership. Ms. Kaiser, local resident, explained the magazine's appeal simply: “People who are reading it kind of feel that sitting down for a family meal or taking dinner to a potluck at church is a very significant part of their lives” (Schrambling 2002).

This sense of community has been reinforced over the years due to the growth of ToH as a means of dissemination. What began as a magazine, today is distributed using a variety of mediums: ToH is mainly the magazine (Figure 1) but it is also an important website where subscribers and enthusiasts have access to the magazine content. ToH publishes cookbooks and special recipe collections every year and its cooking schools have toured the United States since the early 2000s with its series of shows—as many as 300 a year—in which attendees learn as many as ten recipes prepared on stage by one of the cooks who work for the magazine. Social media (Facebook, Twitter, Pinterest, YouTube, and Google+) is also a critical component of ToH schema. The online shop, which sells from cookbooks to kitchen utensils, is a steady source of income. Finally, the visitor center (that drew more than 150,000 customers and guests a year) and the restaurant (whose menu purported to showcase recipes from the magazine) became a significant part of ToH some years ago.

Figure 1: Taste of Home magazine.

These changes in ToH structure are, in part, consequence of changes in its ownership and its different policies. Roy Reiman sold a majority interest in Reiman Publications in 1998 to Madison Dearborn Partners, and in 2002, it was purchased by Reader's Digest Association, a global media and direct marketing company—best known for its flagship publication Reader's
Digest— that defines itself as “a leading global, multi-brand and multi-platform media and direct marketing company that educates, entertains and connects audiences around the world” (Reader's Digest—Trusted Media Brands 2002).

The deal between Reader's Digest Association and Madison Dearborn Partners, reportedly one of the largest seen in publishing, also represented a major customer database transaction: 32 million customers, including 16 million readers (Schultz 2002). Reiman Publications and Reader's Digest Association publish 20 magazines between them and collectively have U.S. databases with more than 80 million customers for magazines, books and other products (PR Newswire 2002), and the duplication factor is low, at 19% (Schultz 2002). 59% of Reiman's database, or 19 million customers, are not Reader's Digest customers (PR Newswire 2002).

The above-mentioned figures show ToH's leadership as the top-selling food magazine in the United States with 4.6 million subscribers, more than Bon Appetit, Gourmet, Food & Wine and Cooking Light combined (PR Newswire 2002). This is mostly due to its owner's dominant position in the editorial world and to the great interest that cooking raises in an important sector of the society.

In conclusion, although a food magazine has a different nature from an online encyclopedia, there are significant reasons that make ToH a relevant case to the Bullipedia:

- **Topic.** ToH is about cuisine like the Bullipedia.
- **Brand.** ToH is the top-selling food magazine in the world from which we can obtain valuable lessons for the Bullipedia.
- **Content creation model.** ToH is an excellent example of user generated content thanks to trust, sense of community and quality content (TasteAd Network 2014). These characteristics are desirable for the future Bullipedia.

**Hypotheses**

ToH asserts that its strong sense of community and its content creation model based on user generation are important factors to succeed. In the next section, we are analyzing this community in order to answer questions such as: Why this sense of community? Is it due to a trust relationship between users? Or between users and content? Is there any reason that makes the community more active? What is the structure of the community (that is, the social network topology)? What relations are there between users? Does ToH's success depend on this configuration?

In order to study ToH community, we have made two assumptions. The first one is that the online community is equivalent to the physical community. In the context of this work, we define the equivalence between two communities this way: Two communities are equivalent if the intersection of their members is large enough (they have a large amount of members in common) and if the members of both communities demonstrate a similar behavior (they communicate with other members with the same frequency). We established a map between magazine/readers and website/users (Figure 2).

Users do not have any means of direct social relationship between them, such as friendship, following or messaging either. This way, the recipe (Figure 3) becomes the hub for interaction; and comments, the only way of communication enabled. In some sense, ToH empowers the community cohesion, but at the same time, it ensures that all the information flow goes through the recipe, that is, it has a central position for the control of information traffic and communication.

*Figure 2: Mapping magazine/website.*
The problem we faced when we tried to study the social network formed around the website is that this information is not open, there is no public dataset or API to access its data. For this reason, we had to study ToH community on Facebook instead. And this is our second assumption: ToH Facebook community is equivalent to ToH website community. We established a new map between website/users and Facebook page/Facebook users (Figure 4).

Our two previous assumptions can be justified by the nature of ToH (magazine and website), the conditions of the subscription to the magazine, and the structure of posts on the Facebook page. On one hand, ToH’s contents and information flow in the magazine and on the website are recipe-centered as there are no other mechanisms for user interactions. That is, subscribers...
communicate with each others only through the recipes. At the same time, although Facebook enables messages between their users, our experiment shows that 99% of them did not have direct communication with any other user except with ToH. Therefore, the members of the three communities demonstrate a similar behavior.

On the other hand, the subscribers of the magazine get full access to the contents of the website, thus, the set of subscribers (set A) is a subset of the total set of website potential visitors (set B). Besides, the posts on Facebook page usually follow the same format: a picture, a description and a link to ToH website, thus (due to this link), the set of Facebook followers (set C) is also a subset of the total set of website potential visitors (set B). This inclusion relation between sets guarantees that the three communities share a large enough amount of members. Hence, we can assert that our assumptions are admissible and the three communities are equivalent.

The experiment

ToH's Facebook page is a public and verified page (https://www.facebook.com/tasteofhome) with 2,830,053 followers (they "like" it), although it is not necessary to like it to post a comment or reply to another user. We analyzed user behavior in terms of how often they post on ToH's Facebook page or they reply to other users' posts, and if they post frequently or they usually post only once. We examined posts until a depth of two, that is, comments posted directly on ToH timeline (L1) or replies to those comments posted on ToH timeline (L2). In this context, a post and a comment are synonymous (Figure 5).

Figure 5: Facebook post.

![Facebook post](image)

Figure 6 shows the model of users' interactions on these two levels. In this representation, there are three classes of entity: timeline, user, and comment; and these possible interactions between them: a timeline belongs to a user, a user posts comments, each comment can be posted directly on a user's timeline (it would start a new thread) or can be a reply to another user's comment. For this experiment, we only considered users and posts on levels L1 and L2 starting from ToH's timeline, as mentioned above.

Figure 6: Facebook publishing model.
We have used three key metrics to understand the topology of the social network, to calculate the frequency of communication between two users, and to detect the most active users. These are:

- **Degree.** The degree of a user is the number of connections that the user has with other users. Formally, the degree of a node is the number of links (incoming and outcoming) that the node has (Jackson 2010).

  \[
  \deg(n) = \deg^-(n) + \deg^+(n)
  \]

- **Contribution.** We define the contribution of a user as the number of comments this user has posted (either on L1 or L2). Formally, the contribution of a node is its outdegree.

  \[
  \text{contrib}(n) = \deg^+(n)
  \]

- **Grade of friendship.** We define the grade of friendship between two users as the number of times that either of them posted on the other's timeline or replied to a comment of the other. Formally, the grade of friendship of two nodes is the total number of edges that exist between both nodes.

  \[
  \text{gf}(n, n_j) = |(n_i, n_j) \in \text{edges}(G) \cup (n_j, n_i) \in \text{edges}(G)|
  \]

**Methodology**

To analyze ToH Facebook social network, we have combined several tools: Python, especially the library NetworkX, Facebook Open Graph API, and Gephi. Python (https://www.python.org) is a programming language that lets users work quickly and integrate systems more effectively. NetworkX (http://networkx.github.io/) is a Python library for the creation, manipulation, and study of the structure, dynamics, and functions of complex networks. Open Graph (http://developers.facebook.com/docs/opengraph) lets access Facebook information through its API. Gephi (http://gephi.github.io/) is an interactive visualization and exploration platform for all kinds of networks and complex systems, dynamic and hierarchical graphs.

The analysis was performed in two steps. In the first step, we extracted all pertinent information from Facebook and built a graph in Gephi format with NetworkX. For this, we used the Open Graph API to send HTTP requests to Facebook servers in order to read every post from ToH page.

The base URL to query Facebook information is:

https://graph.facebook.com

It is necessary to add the user id (for standard users) or the name (for pages) to get the specific profile information. In the case of ToH, it is:

https://graph.facebook.com/tasteofhome

To access ToH's timeline (posts on L1):

https://graph.facebook.com/tasteofhome/feed

For each post on L1, the URL to access its comments (L2) is:

https://graph.facebook.com/<post_id>/comments

Open Graph returns the information in JSON (http://www.json.org). Python is able to handle this format so we programmed in this language the next algorithm to read and process the data provided by Open Graph.
1. Create ToH user
2. For every post on ToH’s timeline (L1):
   a. Get its author
   b. If the author is not ToH, create user if it does not exist
   c. Set gf(user, ToH) = 1
   d. If this relation already existed, increment it by 1
   e. Increment contrib(author) by 1
3. For every comment on each post on ToH’s timeline (L2):
   a. Get its author
   b. Create user if it does not exist
   c. Set gf(user_L1, user_L2) = 1
   d. If this relation already existed, increment it by 1
   e. Increment contrib(author) by 1

The result of this process is a direct multigraph where the nodes are users and an edge from user1 to user2 means that user1 posted a comment on user2’s timeline (only possible if user2 is ToH, as we are only considering ToH’s timeline in this experiment) or replied to a user2’s comment.

The second step was to analyze the graph generated and extract the top nodes by degree (most connected users of the social network), by contribution (most active users), and by grade of friendship (users with the closest relationships). Finally, we visualized the results.

Results

For this experiment, we selected a time frame from January to May, 2014. We processed ~2,000 posts on L1 from which we obtained 55,213 users and 55,346 relations. This small difference between number of nodes and edges indicates that we got a very low density graph. Users barely have interactions between them, which implies that the degree for most nodes is 1 and the grade of friendship is 0 for almost every two pair of nodes. Therefore, we can leave out this metric.

Here we present the top 6 users by contribution:

NODE: 61511025427
name: Taste of Home
degree: 54832
contributions: 1149
greatest grade: (‘1785910425’, {‘grade’: 305, ‘id’: ‘1755’})

NODE: 1785910425
name: User1
degree: 1
contributions: 305
greatest grade: (‘61511025427’, {‘grade’: 305, ‘id’: ‘1755’})

NODE: 100005054680489
name: User2
degree: 1
contributions: 300
greatest grade: (‘61511025427’, {‘grade’: 300, ‘id’: ‘12133’})
In first position, we find ToH with 1,149 contributions and a degree of 54,832. This means that 99% of users (54,832 out of 55,213 total nodes) in the social network communicated with ToH. ToH has its greatest grade of friendship (305) with the user identified by 1785910425.

In second position, we find precisely the person identified by 1785910425, User1. This person has 305 contributions and a degree of 1. This means that User1 communicated only with ToH and no one else. Of course, her greatest grade of friendship is 305 with ToH (identified by 61511025427). The other users exhibit the same behavior as User1.

And now we display the top 6 users by degree:

In first position, we find ToH with 1,149 contributions and a degree of 54,832. This means that 99% of users (54,832 out of 55,213 total nodes) in the social network communicated with ToH. ToH has its greatest grade of friendship (305) with the user identified by 1785910425.

In second position, we find precisely the person identified by 1785910425, User1. This person has 305 contributions and a degree of 1. This means that User1 communicated only with ToH and no one else. Of course, her greatest grade of friendship is 305 with ToH (identified by 61511025427). The other users exhibit the same behavior as User1.

And now we display the top 6 users by degree:
In first position, we find ToH again with a degree of 54,832. Ohio Hog Farmer is the second with a degree of 120, a contribution of 1, and a greatest grade of friendship of 1, too. This means that this user, although only participating once, caused 120 responses from 120 users. It is remarkable that Ohio Hog Farmer is not a standard user but another Facebook page like ToH, and has 172,564 likes.

There are other Facebook pages with similar behavior in third, fourth and fifth positions. The sixth user is User6, a standard user that has a degree of 28 and 31 contributions (he distributes his contributions among many other users as opposed to users such as User1) and his greatest grade of friendship is 7 with ToH.

The following users are similar to User6, but they are certainly uncommon in this network and we find soon traditional users with a degree of 1.

Figure 7 summarizes up these results and shows that the social network has a star topology with ToH as the central node. For visibility purposes, only nodes with a degree > 1 are displayed.

Figure 7: Taste of Home social network topology.
Conclusions and future work

The social network generated from ToH Facebook page has a very low density. We checked that in practically all cases, a user is connected only with ToH. This entails, on one hand, that ToH is placed in a central position, and on the other hand, that users barely share information between themselves. These two conditions make ToH take control of all flow of information, the same situation as the recipe on the website. This is important for such a magazine whose business model is based on a hybrid between subscription and advertising, as it ensures its users always have to visit its own sources of information.

There are some users that encourage the participation of the rest of the community. In this social network, they are ToH, Ohio Hog Farmers, Ally's Sweet & Savory Eats, Historic Deadwood, and Laura's Best Recipes. These are users that have a good reputation, which means that every time they contribute, a high volume of responses from other users is generated. This idea reflects what happens in the physical community: ToH readers trust professional experts who test the recipes. This is especially relevant for a magazine like ToH, whose content creation strongly depends on its community's contribution. Besides the collaboration of Ohio Hog Farmers, which represents an institution, or Ally's Sweet & Savory Eats and Laura's Best Recipes, that have similar interests—suggests that cooperation with partnerships are a key component for mutual success.

We can learn some lessons for Bullipedia from a case like ToH. The main one is: Bullipedia needs reputable users. These users can be Bullipedia itself (an official representation/account/profile), chefs (since users rely on professional expertise) or renowned users that generate trust and encourage other users to participate. The online encyclopedia must implement a mechanism that supports collaboration between experts and non-experts, and also reputation and trust in the community.

ToH uses social media to disseminate its knowledge, mostly Facebook, Twitter and Pinterest. Posts on those media usually follow the same format: a picture, a description and a link to the ToH website. For future, we are planning to research on how this structural framework affects the flow of communication in the ToH community and its influence in the sustainability of ToH model.

Works Cited / Liste de références


