Content in Open Production Communities: Taxonomy and Design Construct

Providing a Taxonomy and Conceptualizing a Construct to Address Content and Content-related Activites

Pujan Ziaie

Department of Computer Science
Technical University of Munich (TUM)
Munich, Germany
ziaie@cs.tum.edu

Helmut Krcmar

Department of Computer Science
Technical University of Munich (TUM)
Munich, Germany
krcmar@in.tum.de

Abstract: Open production communities (OPCs) are online communities in which content is solely generated by users and is publicly available for everyone. By leveraging the manpower and collective intelligence of a vast crowd, these communities facilitate gleaning, structuring, evaluating and sharing information from different perspectives and in different areas of interest. Content, as "the king" in OPCs, has been loosely modeled and defined in the literature. Observing the lack of a standard and generalized terminology in the field of production communities in general and in content-related activities in particular, this paper introduces a fine-grained taxonomy for OPCs and a novel representational construct to resolve inconsistencies based on the existing theories and approaches. The results will establish a standard vocabulary and a unified construct for content to be used by researchers and community designers in this growing field of study.

I. INTRODUCTION (HEADING 1)

The increasing number of internet users and the interactive features of Web2.0 have significantly facilitated content generation and sharing in the last decade. As a result, an enormous amount of content is being produced every second of every day in the Internet, a virtual network that lacks distinguishable voices of authority [1]. Many websites try to accumulate and structure user-generated content in a systematic way to turn the potential creativity, manpower, and knowledge of a vast crowd into reusable knowledge. This potential of a large number of people has been used in many areas such as in providing news (citizen journalism), idea generation (e.g. open innovation communities [2]), software development, or knowledge sharing.

Open production communities are public communities with two or more layers (tiers) of users, in which the generation of content is performed by users and this user-generated content (UGC) is considered as a public good. These online communities have been built around the idea of providing an environment for users to generate, update, evaluate, and share content. They are characterized as gift economies where members are non-competing, have a common objective, and the resources (content) are not scarce, but abundant [3]. In many such communities, in addition to content generation, the information qualification process has also been transferred from experts to the information-seeking and information-generating public [4]. *Wikipedia*, *Slashdot, Flickr* or *Yahoo Answers* are some prominent examples of OPCs, each focusing on a different domain or form of knowledge. Production communities, in general, differ from service-based communities (e.g. for gaming), social networks, and common-bond communities [5] in which the main objective is not necessarily to accumulate high-quality public user-generated content. This "new world" of user-driven production communities have inevitably created a new understanding of many aspects such as collaboration, motivation, ownership, and quality [6]. What all these communities have in common is the salient role of content and users as the sole generator (and sometime evaluator) of content. In other words, content is "the king" in open production communities[1].

Despite the prominent role of content, its variety, and the paramount importance of quality assurance processes, no generic model has been conceptualized to address the major elements of content and no terminology standards have yet been suggested or established to facilitate the communication and accumulation of knowledge in this field.

In this paper, we focus on the following research questions:

RQ1: How can the content, as a construct, be represented in the context of open production communities?

RQ2: What types of OPCs can be distinguished based on the approaches to generate and publish content?

RQ3: What taxonomy can address and standardize content-related entities and activities?

To answer these questions, we address the relevant practices and frequently used terminologies in the context of OPCs based on a critical literature review. Here, the focus is on the content in the information layer rather than in the data layer. In

---

[1] "content in virtual communities is the king" is a quote by Jay Marathe, the head of consulting at Durlacher Research Ltd.

order to conceptualize a generic construct for content, a constructive grounded theory approach [7] was used to glean all relevant elements of content in different types of OPCs and sort them into a number of categories according to their characteristic similarities.

This paper is structured as follows: First, the accumulated knowledge is provided in a structured form in two major domains: content as an entity and content generation as a process. In the first domain, content as an entity is studied and a new construct for content is introduced. In the second part, open production communities are classified into four different domains based on two dimensions: how the content is developed (collaborative vs. creative) and how the content is published (open-gate vs. closed-gate). Then, taxonomy to consolidate and standardize the frequently used terms pertaining to content and content generation is suggested. Finally, the conclusion including a summary of the discussions, important issues and future works will be provided.

II. USER-GENERATED CONTENT: CONCEPTUALIZATION

To conceptualize different aspects and elements of user-generated content, the literature and best practices were reviewed and studied from an engineering perspective with a focus on two main domains: content as an abstract entity and content qualification processes. This section entails content characteristics in production communities and the relevant features of content that may be leveraged to enhance content quality. Based on the gleaned information, a new construct (model) is introduced to represent content in open production communities. The proposed model can explain different behaviors and approaches in various content production contexts.

The term "content" has been used in the literature with different connotations depending on the context and application. Generally, content refers to a piece of information that can be accessed on demand or is available at certain times within the system (in this case, within an online community). Content can be altered, transmitted, viewed, and traded in parts or as a whole [8]. In the context of production communities, however, a common terminology is missing and more sophisticated and refined definitions are needed to address content and its inextricable elements. In many production communities, content is generated by one user, and then extended (by means of comments, tags, ratings, etc.) or edited (in case of collaborative content generation) by others. Regarding the construct of content, four elements can be distinguished for each content: The main body of content (*main content*), separate contents that are categorized under or are related to the main content (*subcontent*), the additional information that is added by users to enrich the main content (*metacontent*), and the additional information that is added by the system[2] to enrich both the main content and its pertinent subcontents (*metainformation*) (see Fig. 1).
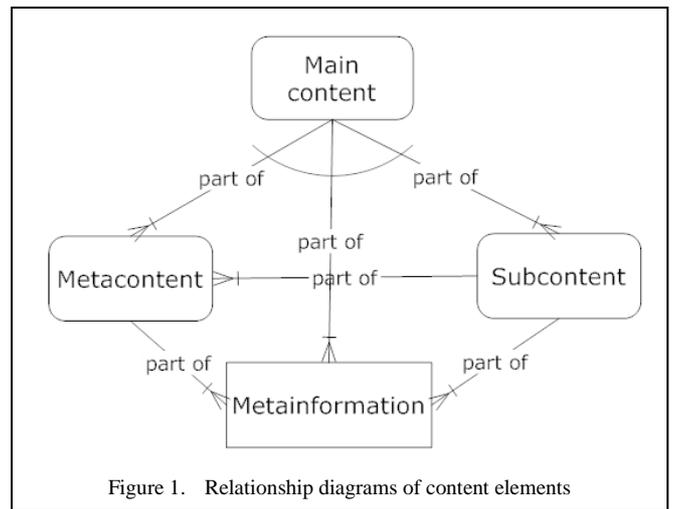
1) Main content

Figure 1.   Relationship diagrams of content elements

Each generated content has a main part, which has sometimes been referred to as the *essence* of content [9]. For example, the main body of articles in an encyclopedia, the text, picture, or video that represents an article or some news in a media website, content of the files in file sharing sites, or blog posts in weblogs can all be considered as "main content". In open collaboration communities [10], where the main content is being generated *collaboratively*, this main content can be edited by other users as well (e.g. in Wikipedia or open source projects). In *creative* production communities, on the other hand, only the user that has generated or publicized[3] [11] the content in the first place is able to update it if necessary [12].

2) Subcontent

Allowing Discussions and reviews over generated content, whether news, an article, a blog post, or an uploaded video or picture allows other members to supplement them with new information from different angles [13]. Nowadays, the discussion (commenting) feature is available in almost every production community for any generated or publicized piece of content. Particularly in the context of open media, it is believed that any news report is per se "*unfinished*" [14] and needs to be extended and enriched from other angels and views. Additional files that are attached to provide additional information can also be considered as subcontent. These subcontents have, in fact, all the features of the main content, with the exception that they are categorized or located as a subsection of a main content. In other words, their existence is based or dependent on another piece of content.

3) Metacontent

Metacontent refers to the user-generated supplementary information that can be added to a piece of content (main content as well as subcontent) in order to subjectively specify its value (evaluative) or to enrich its characteristics and scope (descriptive). In the literature, human-generated metadata [15], socially-generated metadata[4] [16], metadata [17] or metainformation [18] are commonly used terms to address this socially-

---

[2] This additional information can be added periodically, event-based, or at the time of generation

[3] Publicizing is defined as creating pointers to reports or news that have been generated elsewhere. Publicizing is a common action in social bookmarking websites.

[4] Socially-generated metadata has been used to address both metacontent and subcontent
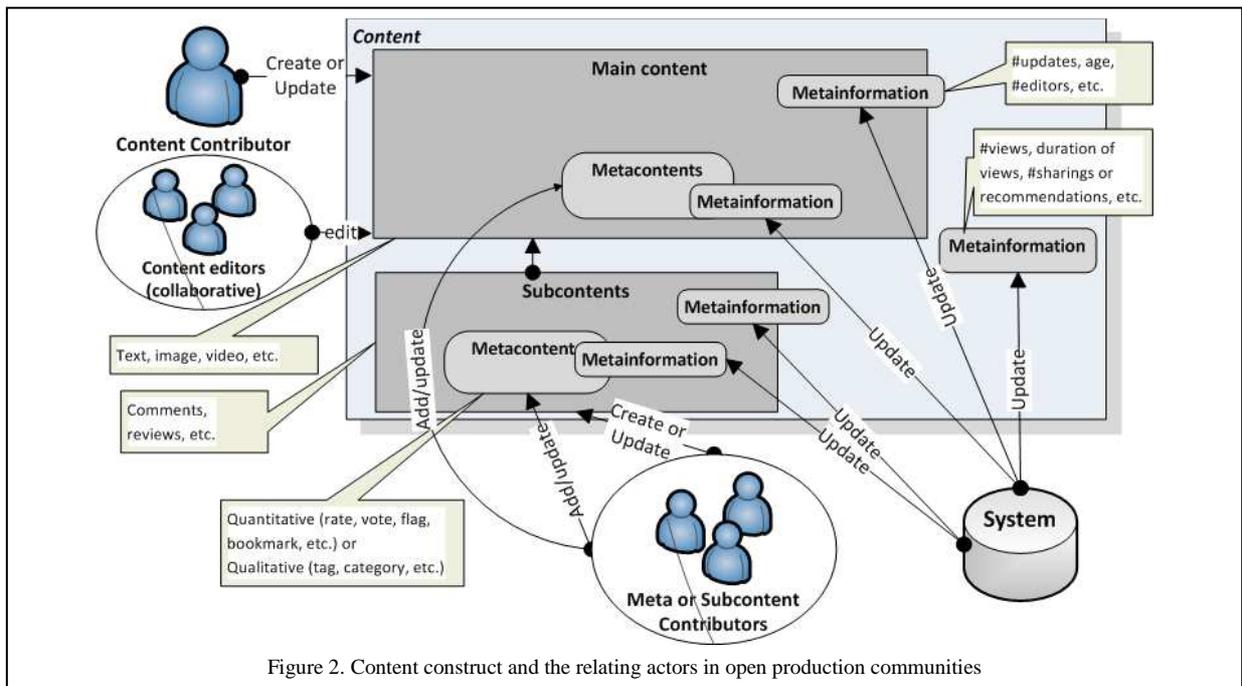
Figure 2. Content construct and the relating actors in open production communities

generated constituents of content. Metacontent is with no doubt one of the key features driving the growth and success of Social Web [19]. The quality of metacontent (especially its accuracy and consistency) is of great importance, since it is frequently used to assess the quality of content [17].

Contributing metacontent is in part a personal act (for organizing content for own use) and in part a social activity to help others (and also the system) with finding, interpreting, evaluating, and understanding the essential message of a piece of content [20]. The most known types of metacontent are tags (labels), categories, and ratings; nevertheless, any other socially-generated information such as votes, flags, favorites, notes (when editing or updating the main content for example), or other user-generated supplementary information can also be considered as metacontent.

4) Metainformation

The term metainformation is chosen to address any type of supplementary information that is extracted, detected, or derived from the *context*, the *content*, and the transacting *users* by the system. Davis et al. [21] refer to this process as the "*context-to-content*" paradigm. Although "*metadata*" has also been used in the literature to address additional information for content (e.g. in [22]), we deliberately refrained from using "data" and "metadata" in this particular context, so that we can draw a distinct line between the data layer (relating to database and data storages) and the information layer (any piece of information that can be processed by human-beings). Metainformation is, therefore, useful pieces of information that can be gathered or calculated by the system from the context (e.g. the origin of content, the location or IP address of the contributing user or viewing users), the content (e.g. currency of content, its size and richness, or the number of edits) [23], and the user (e.g. his or her reputation within the community, age, origin, background, etc.).

When designing a community, depending on the context, possible (inter)actions and the corresponding implications should be identified in advance as relevant metainformation. Metainformation can encompass relevant information about all user-generated elements of content, including the main content, its subcontents and metacontents. It should also contain pertinent information on different combinations of or interrelations between these elements (see Fig. 2). The information that pertains to these interactions should then be gathered either at the point of generation, or at the time of occurrence of relevant transactions, or periodically (via batch-processing for example). Similar to metacontent, metainformation is of great value to the system to assess or predict content quality [24]. It also provides valuable data for clustering algorithms (e.g. to identify similar segments of content or groups of users), search engines (to index and filter information and optimize their results) [25], and recommendation systems (e.g. to suggest relevant content to be viewed or updated) [26]. Moreover, it has been suggested that the values of metainformation be normalized by the category of content so that the possible future evaluations would be more accurate [27].

Fig. 2 demonstrates the construct of content as a whole and its constituents as well as the contributing actors. As depicted in this figure, users can create, update and edit the main content, subcontents, and their corresponding metacontents. The system, then, provides metainformation on all these three elements and the relevant combinations of them (e.g. the versatility of editors or the number of clicks on the links in the main content). In the next section, different approach towards content generation will be discussed.

III. CONTENT GENERATION AND APPROVAL APPROACHES

The second domain of our study emphasizes content qualification and publication processes and suggests a categorization of OPCs based on two dimensions: the approach to generate and update content (collaborative vs. creative) and the publica-

tion process of the content (open-gate vs. closed-gate). Based on the culled knowledge from these two domains, at the end of this section, we ultimately suggest a standard and consistent taxonomy that can be used by the scientific community to address features and mechanisms related to content and content generation processes and activities.

In open production communities, two main approaches towards content generation and improvement can be distinguished: *collaborative* and *creative*. The major difference between these two approaches is how they deal with content modifications. What is, however, similar in both approaches, is accepting the fact that content is "*unfinished*" [14]. In the first approach users collaborate mainly in improving the main content, while in the second approach they collaborate in extending the content by adding descriptive and evaluative metacontent.

A. Collaborative content generation

In the context of knowledge development, collaborative content generation not only helps to keep the knowledge pool up-to-date, but also provides an opportunity to add multiperspectivity to matters where no objective quality standards can be achieved. In other contexts such as collaborative architectural sketching, video editing, or geographical maps [10], providing editing features helps improving the content based on a set of agreed objective criteria. Despite all these advantages, however, it should be noted that editing features also open up the door to vandalism [28]. This concern has led to some skepticism over the credibility and quality of the generated content [29], which in return magnifies the need for apt mechanisms to assure content quality in such communities.

The contribution patter in collaborative OPCs differs even in active members. Some members are considered main content contributors (who generate main content and instantiate the edition/revision process), while others are either metacontent contributors or merely main content *editors*[5] [30, 31].

The most salient issues and challenges in designing and governing a platform for collaborative content generation are generally lack of contribution, duplicity or redundancy of data, conflict management between users with differing ideologies or perspectives [32], dealing with vandals [29] such as trolls [33] or spammers [34], and the development of a common ground by training users and familiarizing them with the norms, philosophy and objective of the community [35]. Next, we review the characteristics of *creative* communities.

B. Creative content generation

In creative open production communities, the main content is either not easily updatable (e.g. videos and photos) or can be modified merely by the creator of the content and not by other ordinary users [12]. The collaborations and interactions, therefore, take place mainly in the subcontent and metacontent layers. Weblogs, review portals, open file sharing platforms, questions and answers portals, public discussion forums and open media sites are prominent examples of creative content

---

[5] Content editors wait for others to generate content and then extend or revise it.

generation [36]. Subcontent is usually in the form of comments/discussions, reviews, answers, or file attachments. Metacontent mainly consists of tags, categories, and any possible means of evaluation (ratings, votes, bookmarks, etc.). Since filtering and sorting content is largely based on user evaluation, finding apt evaluation criteria and quantitative measures for quality is of great importance in creative communities.

Similar to collaborative communities, the contribution behavior in communities with semicollaborative content is also different. Some users tend to contribute main content, some merely generate subcontent or metacontent [30]. This behavior might change with regard to the member lifespan [37]. Moreover, because of the significance of users' evaluation, encouraging metacontent contribution is sometimes more important than encouraging main content contribution, especially after a community has reached its critical mass of active users or content [38].

Issues and challenges in creative communities are slightly different from those of collaborative ones. While in collaborative communities the focus is on constructive coordination and quick reversion of vandalism, achieving a practical and effective way of evaluating the quality of content is of great importance in creative communities. Ill-intended or dishonest users who try to game the system or build up gangs to pimp content to the top (or the first page in open media sites for example) are common issues to deal with. This is due to the fact that here, unlike collaborative communities, user evaluation plays a vital role in assessing the value of content and filtering/sorting it. Designing proper criteria for content evaluation to combine the subjective judgment of users with respect to objective criteria is another challenging task that requires delicate attention. Moreover, the criteria should be comprehensive enough to adequately address quality measures of content, yet these criteria shall not be too complicated, lest they impose high cognitive burden on users [39].

Finally, it should be noted that user interaction still exists in creative communities; however, it is merely taking place on the metacontent and subcontent elements.

C. Content Approval/Publication Approaches: Open-gate vs. Closed-gate

Some researchers have divided production communities into two general categories [11, 40]: open-gate (or open) and closed-gate (or gated). This categorization is with regard to quality approval process and lies on the basic principles of production. In manufacturing, quality can be assured or improved by either introducing quality enhancement processes (as in open-gate communities) or by applying stricter quality approval procedures for the ready products (as in closed-gate communities) [41].

In open-gate communities, content will be published (meaning made available to the public) at the same instant it is produced or delivered. The evaluation and quality enhancement procedures follow the publication. In (open-gate) collaborative communities, this quality enhancement is performed by other users in forms of discussions and editions. In (open-gate) creative communities, the content is enriched by other users through their metacontent and subcontent contributions (dis-

cussion for example). The creator of the content can also update the content based on contextual changes or others' suggestions (through discussions and other possible feedback mechanisms). This way, in many cases, there is no "final" or "perfect" version of content, but content is being improved in a continuous process. One disadvantage of open-gate communities is the possibility of them getting filled out with garbage. Therefore, apt mechanisms to filter and sort content should be practiced in addition to quality enhancement methods in order to encourage high quality of content and exclude content with low quality.

In closed-gate communities, content should go through an approval process before being published and made visible to the public. Closed-gate approach is often practiced in communities with sensible or critical content. Open source communities and critical knowledge platforms (scientific forums reference repositories) are two well-known communities that have a closed-gate system of content publication. The Gene Ontology is a popular example of this approach. The aim of this platform is to use crowdsourcing to standardize the representation of gene and gene product attributes across species and databases. To secure a certain level of credibility, however, contributions (provided vocabularies) go through a control process. The output of open source communities should be controlled and approved as well, since too many faults in the published product (software) can oppose serious threat to the credibility of the product and the community.

IV. COMMUNITY CATEGORIZATION AND A STANDARD TAXONOMY

We propose a framework to categorize current open production communities based on two dimensions: The collaborativeness of content generation (whether the content is generated collaboratively or creatively), and the openness of content publication processes (whether it is closed-gate or open-gate). As a result, four categories of OPCs can be distinguished: creative open-gate communities, creative closed-gate communities, collaborative open-gate communities and collaborative closed-gate communities. The corresponding matrix including some examples for each category is depicted in Fig. 3.

This categorization provides a framework and narrows the focus for studies on pertinent design concepts and operational mechanisms such as incentive systems, recommendation systems, quality assurance mechanisms, and community governance. Because of similar approaches towards content generation and quality assurance, one can hypothesize that the procedures, guidelines, and practices of each of these concepts show some level of similarity for each of these categories. Moreover, this categorization establishes a common ground to study the impact of the type of content (text, image, software code, videos, etc.) for specific concepts and systems (e.g. recommendation systems).

Finally, based on the conceptualized construct for content and the existing approaches for content generation and publication, a list of common terms is provided. Table I. summarizes this standard terminology (taxonomy) for the context of open content production communities.
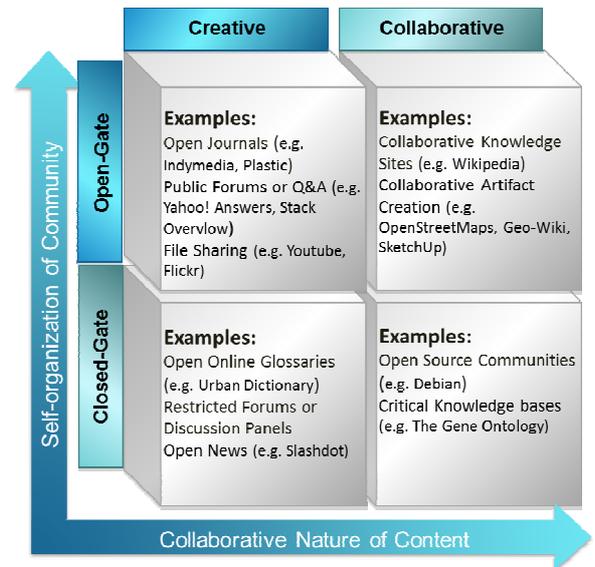

Figure 3. Communities and user-generated content: Collaboration level and publication policy

V. CONCLUSION

Open production communities (OPCs) and user-generated content (UGC) are rather new phenomena that were initiated by the popularity of open source communities. The concept of crowdsourcing a wide range of activities from content generation to content evaluation and approval, quality enhancement and community governance has been rapidly growing and been applied in other contexts since the introduction of Web2.0. Although there is a large body of literature in this research area, standards and common models and frameworks are not yet widely established. In this paper, we conceptualized a new construct for content to be used in the context of OPCs. The proposed construct consists of four elements: main content, subcontent, metacontent, and metainformation. The first three elements are often contributed by users (with an exception of bots or some techniques to import information from other repositories) and the last one automatically by the system. This construct helps scholars to have a common model to use and address when conducting research in content-related areas of study. Furthermore, two approaches where distinguished in the process of content generation and publication. Content generation can be performed either collaboratively or creatively. In collaborative content generation every user has the right to edit and improve the main content, whereas in creative content generation only the creator of content may alter the main content and the other users may only contribute metacontent and subcontent. Regarding content publication, two major approaches were identified: closed-gate and open-gate. In closed-gate approach, content should be approved by privileged users based on specific quality criteria before being published. In open-gate approach, content is published right after being generated and the quality enhancement follows the publication by all users, whether collaboratively, or by suggesting amendments or enriching the content by contributing subcontent and metacontent.

TABLE I.   A TAXONOMY OF CONTENT-RELATED ACTIONS AND ENTITIES IN OPEN PRODUCTION COMMUNITIES

Term	Definition	Example(s)
Main Content	Main body (the essence) of content that has been generated (or initiated) by one user.	Articles of an encyclopedia, News or articles of open news websites, videos and music files in file sharing websites, etc.
Metacontent	The additional piece of information that is attached to a piece of content mainly by users in order to enrich its essence.	tags, categories, edition note, votes, ratings, flags, recommendations, etc.
Subcontent	The additional stand-alone content which has interdependencies with the main content, however, it can yet be considered as a separate piece of content with its own set of meta-contents.	Comments and discussions, answers to questions (in Q&A or discussion-based websites), reviews of an item, etc.
Metainformation	Any information pertaining to the main content, subcontent, or both that is extracted or captured by the system. Metainformation mostly relates to contributors (main, sub, or meta) and their transactions, and also statistics regarding the usage of content and its elements.	Date of creation, number of views, format, number of edits, time of evaluation, duration of views, location, number and diversity of subcontent or metacontent contributors (e.g. commenters), etc.
Content generation	The act of generating main content and if necessary the additional elements of content (e.g. metacontent). In collaborative communities, generating content is equal to initiating it, for every other user may update (edit or extend) the generated content (see the descriptions below).	Adding a new article to Wikipedia, adding a piece of news on open media website (e.g. Slashdot), adding source code in Open source software (OSS) communities, uploading a video on file sharing websites (e.g. YouTube), etc.
Metacontribution and metacontributors	Metacontribution is the act of contributing metacontent instead of generating a whole piece of content (content generation). Metacontribution can be *descriptive* (e.g. tagging an item) or *evaluative* (e.g. rating an item).	Tagging content (items) in open file sharing websites (e.g. Flickr), evaluating content (e.g. like/dislike or Likert-scale evaluations), bookmarking an item, etc.
Collaborative (community or content generation)	Collaborative content generation is a system in which all users who have the right to generate content, may edit and extend the content that has been generated (initiated) by others	Wikipedia and OSS communities are prominent examples of collaborative content generation. Open sketching and open map development websites are other important applications of this type.
Creative (community or content generation)	Creative content generation is when only users who generate a specific piece of content (an item) may update the main content (with an exception of administrators or other privileged users). In these communities, feedback mechanisms such as discussion (comments) or directly contacting the creator are essential means to improve the quality of content by adding new perspectives and suggesting improvements.	Open file sharing websites (e.g. YouTube or Flickr), open (creative) knowledge sharing communities (e.g. *urbandictionary.com*), discussion-based or Q&A communities (e.g. Yahoo Answers or online discussion forums) and open media (e.g. *Slashdot* or *Digg*) websites are the four prominent types of creative communities.
Content publication	Publishing content is the act of making it available to other users or the public.	Confirming the submitted source code in OSS communities or accepting a new entry in closed knowledge sharing websites (e.g. *geneontology.org*)
Closed-gate communities	Communities, in which the content should first be confirmed or admitted by privileged users (experts or admins) to be publicly available to others.	In open source communities, usually the owner(s) keep the right of "gatewatching" the public edition/revision of the software to assure an acceptable quality of source code.
Open-gate communities	In open-gate communities, the generated content is published (made available to other users or everyone) at the time of generation, without any other further steps to confirm the content. Inappropriate or harmful content can later be removed automatically by the system (e.g. upon receiving too many negative ratings) or manually by privileged users.	Many open file sharing websites (e.g. YouTube or Flickr) or open media (e.g. Digg.com) have an open-gate system. In such systems, fitting algorithms is applied at the point of content generation to prevent users from generating redundant or inappropriate content (e.g. publishing copyright-protected content)
Editing vs. updating	To draw a fine line between editing content in collaborative communities and updating (own) content in creative ones, *editing* is used to any form of changing or extending content in collaborative communities. Updating content is performed solely by the content owner in creative communities.	Changing or extending the text of an article in Wikipedia or modifying the source code in OSS communities are examples of "editing". Updating is either changing the whole main content (changing an image or video in open file sharing websites) or updating the main content in creative communities.

There are several issues that should be dealt with attention in the context of OPCs. For example, user-generated content forces some redefinitions and rethinking of what content is, who owns it [42], or who has responsibility for it [43]. Especially in collaborative communities, new notions of authorship should be pondered and defined [44]. Moreover, a practical implication is what kinds of metainformation to define for content. When designing a community, depending on the context, helpful information based on possible interactions should be identified as relevant metainformation and be collected/calculated and added to the content (for example the versatility of evaluators can be calculated and considered as a quality factor).

As for future work, distinct characteristics of the four general types of OPCs will be studies for different design features such as incentive systems, quality assurance processes, recommendation systems or governance mechanisms. For example, it is not yet clear whether the design or implications of content qualification measures or incentive practices are significantly different in the four distinguished types of communities. The impact of the type of content (text, source code, image, etc.) should also be studied to deepen our understandings towards open production communities and their characteristics.

REFERENCES

[1]   R. D. Lankes, "Trusting the Internet: New Approaches to Credibility Tools," The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning, pp. 101-121, 2007.

[2] I. Blohm, O. Köroglu, J. M. Leimeister, and H. Krcmar, "Absorptive capacity for open innovation communities-learnings from theory and practice," in Academy of Management Annual Meeting, 2011.

[3] T. Herath and G. L. Sanders, "Sharing of Knowledge in Public Knowledge Spaces: Influencing Factors," in Americas Conference on Information Systems (AMCIS), 2007.

[4] M. J. Metzger, "Making sense of credibility on the Web: Models for evaluating online information and recommendations for future research," Journal of the American Society for Information Science and Technology, vol. 58, pp. 2078-2091, 2007.

[5] S. Utz and K. Sassenberg, "Distributive justice in common-bond and common-identity groups," Group Processes & Intergroup Relations, vol. 5, p. 151, 2002.

[6] G. Fischer, "End-User Development and Meta-Design: Foundations for Cultures of Participation," End-User Development, pp. 3-14, 2009.

[7] K. Charmaz, "Grounded theory: Objectivist and constructivist methods," in Strategies of qualitative inquiry. vol. 2, N. K. Denzin and Y. S. Lincoln, Eds., ed, 2003, p. 249.

[8] A. Mauthe and P. Thomas, Professional content management systems: Wiley Online Library, 2004.

[9] H. Schachlbauer and S. Weiss, "EBU/SMPTE Task Force for harmonized standards for the exchange of program material as bit streams-Final report: Analysis and results," Smpte Journal, vol. 107, pp. 605-815, 1998.

[10] L. De Alfaro, A. Kulshreshtha, I. Pye, and B. T. Adler, "Reputation Systems for Open Collaboration," Communications of the ACM, vol. 54, pp. 81-87, 2011.

[11] A. Bruns, Gatewatching: Collaborative Online News Production vol. 26: Peter Lang Pub Inc, 2005.

[12] P. J. McKenzie, J. Burkell, L. Wong, C. Whippey, S. E. Trosow, and M. B. McNally, "User-Generated Online Content 1: Overview, Current State and Context," First Monday, vol. 17, 4 June 2012 2012.

[13] S. Bowman and C. Willis. (2003). We media: How audiences are shaping the future of news and information.

[14] G. Meikle, Future Active: Media Activism and the Internet: Routledge, 2002.

[15] J. Greenberg and W. D. Robertson, "Semantic Web Construction: An Inquiry of Authors' Views on Collaborative Metadata Generation," in International Conference on Dublin Core and Metadata for e-Communities, Florence, Italy, 2002, pp. 45-52.

[16] M. Chen, X. Liu, and J. Qin, "Semantic Relation Extraction from Socially-Generated Tags: A Methodology for Metadata Generation," in International Conference on Dublin Core and Metadata Applications, 2008, pp. 117-127.

[17] J. R. Park and Y. Tosaka, "Metadata Quality Control in Digital Repositories and Collections: Criteria, Semantics, and Mechanisms," Cataloging & Classification Quarterly, vol. 48, pp. 696-715, 2010.

[18] M. Ames and M. Naaman, "Why We Tag: Motivations for Annotation in Mobile and Online Media," in the SIGCHI Conference on Human Factors in Computing Systems, San Jose, California, USA, 2007, pp. 971-980.

[19] E. Khabiri, C. F. Hsu, and J. Caverlee, "Analyzing and Predicting Community Preference of Socially Generated Metadata: A Case Study on Comments in the Digg Community," in the Third International ICWSM Conference, San Jose, California, USA, 2009.

[20] L. Van Velsen and M. Melenhorst, "Incorporating User Motivations to Design for Video Tagging," Interacting with Computers, vol. 21, pp. 221-232, 2009.

[21] M. Davis, S. King, N. Good, and R. Sarvas, "From Context to Content: Leveraging Context to Infer Media Metadata," in Multimedia 2004 (MM'04), New York, USA, 2004, pp. 188-195.

[22] I. M. Bilasco, S. Amir, P. Blandin, C. Djeraba, J. Laitakari, J. Martinet, E. M. Gracia, D. Pakkala, M. Rautiainen, and M. Ylianttila, "Semantics for Intelligent Delivery of Multimedia Content," 2010, pp. 1366-1372.

[23] B. Stvilia, M. B. Twidale, L. C. Smith, and L. Gasser, "Assessing Information Quality Of A Community-Based Encyclopedia," in the 2005 International Conference on Information Quality, Cambridge, MA, USA, 2005.

[24] B. Stvilia, L. Gasser, M. B. Twidale, and L. C. Smith, "A Framework for Information Quality Assessment," Journal of the American Society for Information Science and Technology, vol. 58, pp. 1720-1733, 2007.

[25] B. Stvilia, C. Jörgensen, and S. Wu, "Establishing the Value of Socially Created Metadata to Image Indexing," Library & Information Science Research, 2011.

[26] M. Şah and V. Wade, "Automatic Metadata Extraction from Multilingual Enterprise Content," presented at the the 19th ACM International Conference on Information and Knowledge Management, Toronto, ON, Canada, 2010.

[27] E. Agichtein, C. Castillo, D. Donato, A. Gionis, and G. Mishne, "Finding High-Quality Content in Social Media," in The international Conference on Web Search and Web Data Mining, New York, NY, USA, 2008, pp. 183-194.

[28] H. Nofrina, V. Viswanathan, T. Poorisat, B. H. Detenber, and P. Chen, "Why Some Wikis are More Credible than Others: Structural Attributes of Collaborative Websites as Credibility Cues," Observatorio (OBS*), vol. 3, 2009.

[29] G. Gorman, "A Tale of Information Ethics and Encyclopedias; or, Is It Wikipedia/It Just another Internet Scam?," Online Information Review, vol. 31, pp. 273-276, 2007.

[30] S. Oreg and O. Nov, "Exploring Motivations for Contributing to Open Source Initiatives: The Roles of Contribution Context and Personal Values," Computers in Human Behavior, vol. 24, pp. 2055-2073, 2008.

[31] S. Sen, S. K. Lam, A. M. Rashid, D. Cosley, D. Frankowski, J. Osterhouse, F. M. Harper, and J. Riedl, "Tagging, Communities, Vocabulary, Evolution," 2006, pp. 181-190.

[32] A. Forte and A. Bruckman, "Scaling Consensus: Increasing Decentralization in Wikipedia Governance," in the 41st Annual Hawaii International Conference on System Sciences, Hawaii, 2008, p. 157.

[33] P. Shachaf and N. Hara, "Beyond Vandalism: Wikipedia Trolls," Journal of Information Science, vol. 36, pp. 357-370, 2010.

[34] A. G. West, J. Chang, K. Venkatasubramanian, O. Sokolsky, and I. Lee, "Link Spamming Wikipedia for Profit," 2011, pp. 152-161.

[35] G. Convertino, H. M. Mentis, M. B. Rosson, J. M. Carroll, A. Slavkovic, and C. H. Ganoe, "Articulating Common Ground in Cooperative Work: Content and Process," 2008, pp. 1637-1646.

[36] K. Chai, V. Potdar, and T. Dillon, "Content Quality Assessment Related Frameworks for Social Media," Computational Science and Its Applications–ICCSA 2009, pp. 791-805, 2009.

[37] O. Nov, M. Naaman, and C. Ye, "Analysis Of Participation In An Online Photo‐Sharing Community: A Multidimensional Perspective," Journal of the American Society for Information Science and Technology, vol. 61, pp. 555-566, 2010.

[38] S. R. Hiltz and M. Turoff, The network nation: Human communication via computer: The MIT Press, 1993.

[39] H. Masum, C. Newmark, and M. Tovey, The Reputation Society: How Online Opinions Are Reshaping the Offline World: Mit Pr, 2012.

[40] S. K. Shah, "Motivation, Governance & the Viability of Hybrid Forms in Open Source Software Development," Management Science, vol. 52, pp. 1000–1014, 2006.

[41] H. E. Cook and H. E. Cook, Product Management: Value, Quality, Cost, Price, Profits, and Organization: Chapman & Hall London, 1997.

[42] S. Humphreys, "Norrath: New Forms, Old Institutions," The International Journal of Computer Game Research, vol. 9, 2009.

[43] C. George and J. Scerri, "Web 2.0 and User-Generated Content: legal Challenges in the New Frontier," Journal of Information, Law and Technology, vol. 2, 2007.

[44] R. Hunter, "Erasing "Property Lines": A Collaborative Notion of Authorship and Textual Ownership on a Fan Wiki," Computers and Composition, vol. 28, pp. 40-56, 2011.