

# Talk is silver, code is gold? Contribution beyond source code in Free/Libre Open Source Software communities

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## Abstract

While contributions to the digital commons of Free/Libre Open Source Software (FLOSS) communities, such as source code and documentation, have been widely explored, other types of contribution have remained less visible. This paper offers empirical evidence of the perception of “community-oriented” activities as contributions, their lack of visibility in digital collaboration platforms, and their relevance for the sustainability of the community. Additionally, the paper connects this issue to the larger literature on the commons, by drawing on the concept of affective labour. The “code-centric” FLOSS community, Drupal, was used as a case study, triangulating data from participant observation, documentary analysis and qualitative semi-structured interviews obtained following an ethnographic approach.

**Keywords:** affective labour, Commons-Based Peer Production, Computer-Supported Cooperative Work, contribution, Drupal, ethnography, Free/Libre Open Source Software, qualitative research, Science and Technology Studies

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# 1 Introduction

Commons-Based Peer Production (CBPP) is a new model of socio-economic production in which groups of individuals cooperate with each other to produce meaningful products without a traditional hierarchical organisation (Benkler, 2002, 2006). The notion of contribution is a key element of CBPP communities. As argued by Wittel (2013), those CBPP communities focussed on the production of digital commons typically possess an economy of contribution (not based on direct reciprocity), rather than an economy of gift (based on direct reciprocity). In these cases, the notion of what kind of activities are understood as contributions becomes blurred, and can be understood as a set of meanings which are constantly evolving through negotiation among the community members.

Free/Libre Open Source Software (FLOSS) is one of the most well-known examples of CBPP. FLOSS refers to software that allows its use, copy, study and modification in any way. In order to ensure these rights, the source code, a set of computer instructions written in a programming language, is released under a license which protects them.

The conception of contribution has been employed in the study of FLOSS, but mainly in reference to activities related to source code. For example, Krogh and Hippel's (2006) literature review on FLOSS identified three main research streams: motivations for contributing; governance, organisation, and innovation processes; and competitive dynamics. The notion of contribution is especially relevant in studies of motivation. These have explored one of the most widely tackled question in FLOSS: "Why do people contribute?". As the development of source code is the most well-known type of contribution activity, it has also been the most widely studied (e.g., Bergquist & Ljungberg, 2001; Ghosh, Glott, Krieger & Robles, 2002; Lerner & Tirole, 2002; Dalle & David, 2003; K. Lakhani & Wolf, 2003; Stenborg, 2004). Similarly, studies in the second stream have mainly focussed on the relationship between organisation and contribution, and have principally examined the development of source code as the main type of contribution (e.g., Franck & Jungwirth, 2002; Dempsey, Weiss, Jones & Greenberg, 2002; Koch & Schneider, 2002; Grewal, Lilien & Mallapragada, 2006; MacCormack, Rusnak & Baldwin, 2006).

Another illustration of this "code-centrism" in research on FLOSS can be found in the literature review of Crowston, Wei, Howison and Wiggins (2012), in which the authors used an inputs-mediators-outputs-inputs model (Ilgen, Hollenbeck, Johnson & Jundt, 2005) to review 135 papers. In the case of inputs, most of the literature related to individual participation considers source code related activities (e.g., Luthiger, 2005; Robles, Gonzalez-Barahona & Michlmayr, 2005; Roberts, Hann & Slaughter, 2006; Fershtman & Gandal, 2007). A similar "code-centric" character can be observed with regard to the outputs, for example regarding FLOSS team performance (e.g., Bezroukov, 1999; Samoladas, Stamelos, Angelis & Oikonomou, 2004; Gyimothy, Ferenc & Siket, 2005; de Joode & Egyedi, 2005). A few studies on the level of commitment have moved the focus from code contribution (e.g., Mockus, Fielding & Herbsleb, 2000, 2002) to explore communication contributions (Crowston & Howison, 2006) and support contributions (K. R. Lakhani & Von Hippel, 2003).

The present study continues this shift, drawing on Hardt's (1999) concept of affective labour, defined as the immaterial labour present in human interaction that creates or

modifies emotional experiences. This includes intangibles, such as excitement, kinship, passion, familiarity, reciprocity, or sense of community, all of which have been identified as contribution motivators in FLOSS communities (e.g., Zeitlyn, 2003; Freeman, 2007; Fang & Neufeld, 2009).

The relevance of affective labour to CBPP communities is of increasing interest to CBPP scholars. In a recent online article, Bollier (2014) cited the study of Singh (2013) on the importance of affective labour in CBPP communities, labelling affective labour as its “lifeblood”. Singh (2013) provides a compelling case study of the dynamics of affective labour in the non-digital domain, by examining the daily practices of a community-based initiative to protect and regenerate a forest in Odisha (India), and showing how these practices transform not only the object (the forest, in this case), but also the individual and collective subjectivities of the villagers.

This paper explores a similar set of dynamics happening in FLOSS communities, looking at the Drupal community as a case study. Drupal is a FLOSS content management framework released in 2001. The Drupal community has been growing constantly: there are currently more than 1 million people registered at the main collaboration platform (Drupal.org), and more than 30,000 committers of source code<sup>1</sup>. The community is also highly active offline, with events of different scope (local, regional/national and international) being held every week around the world (e.g. 2754 events in 2013<sup>2</sup>). The study of which activities are considered contributions by its members becomes especially relevant in an extreme case such as Drupal, which has been previously characterised as a “code-centric” community (Zilouchian Moghaddam, Twidale & Bongen, 2011; Sims, 2013). This “code-centric” facet of the community is illustrated by the well-known Drupal motto: “Talk is silver, code is gold”<sup>3</sup>. The motto embodies the traditional belief in FLOSS communities that the most valuable type of contribution that a participant can provide is source code.

With this goal in mind, qualitative research was undertaken to shed light on activities not widely studied due to their traditional lack of visibility, as well as those activities “officially” considered contributions (e.g. those listed in the main collaboration platform<sup>4</sup>). It is argued that these less visible activities enable the creation of individual and collective subjectivities among members of the Drupal community, and are a significant factor in its sustainability. The research questions addressed are as follows:

- What type of activities are perceived as contributions in the Drupal community? Do the “official” meanings match those of the members of the community?
- How are the identified activities represented in the main collaboration platform at an individual level?
- Can some of these activities be understood as sources of affective labour and what

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<sup>1</sup>See <https://www.drupal.org/>, accessed on 30 April 2014.

<sup>2</sup>See <https://groups.drupal.org/events>, accessed on 11 June 2014.

<sup>3</sup>As an illustrative example, the motto can be found in relevant Drupal blogs such as the one of the Drupal Association (see <https://assoc.drupal.org/node/709>, accessed on 25 July 2015), or the official one of the largest Drupal business company, Acquia (see <http://www.acquia.com/blog/talk-silver-code-gold-acquias-code-contributions-drupal-project>, accessed on 25 July 2015).

<sup>4</sup>See <https://www.drupal.org/contribute>, accessed on 30 April 2014.

relevance do they have? Are there any differences in how they are perceived between members with different degrees of experience?

## 2 Methods

The study followed an ethnographic approach. Because of the digital nature of the main produced object and the global scope of the project, many of the activities of the community are carried out online. However, the volume of face-to-face events suggested that they also might play an important role in the life of the community. For these reasons, the study straddled both dimensions: the online and the offline. Analogous approaches have previously been followed by similar studies in which both dimensions are relevant, as in Coleman's (2013) study of FLOSS communities and hacker culture.

Three data collection methods were employed: participant observation, documentary analysis and semi-structured qualitative interviews. The participant observation ran from 14 April 2014 to 5 October 2014, and consisted of observation through the main collaboration platform (Drupal.org), including discussions in online groups and issues lists, interactions via the maintenance of contributed modules, interactions in Drupal related channels in Internet Relay Chat, etc. Additionally, participation through external digital platforms around the Drupal ecosystem such as Twitter, Meetup and LinkedIn became more relevant than originally expected. For example, video-conference discussions with members of the Drupal community were agreed after initial interactions via Twitter.

Regarding the offline dimension, the sampling was designed strategically (Mason, 2002) to cover local (e.g. Drupal Sprint Weekend), national/regional (e.g. DrupalCamp North East 2014) and international (e.g. DrupalCon Europe 2014) events. Observation was carried out at 13 events, with an emphasis on local events, to avoid limitations found in previous studies (Nordin, 2014, p. 96).

With respect to the documentary analysis, Drupal Planet was selected as an initial point for the collection of documents. Drupal Planet is a popular Really Simple Syndication (RSS) feed within the Drupal community, whose guidelines<sup>5</sup> exclude press releases, job announcements and technical posts which only mention Drupal briefly. Since the posts at Drupal Planet are only retained for 16 weeks, a set of software scripts<sup>6</sup> was developed to collect posts from 29 May 2013 to 15 October 2014, yielding an archive of 3,266 documents relevant to this study.

In addition to the articles selected from Drupal Planet, links to cited websites that were relevant for this research were included; for example, links to the discussion of an issue in a group in Drupal.org, documents mentioned during offline or online discussions, and digitised physical materials collected during the offline participant observation among others. A similar strategy was followed with regard to user profiles at Drupal.org. The data includes personal profiles from Drupal.org, as well as all those in subsystems such

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<sup>5</sup>See <https://drupal.org/planet/guidelines>, accessed on 25 May 2014.

<sup>6</sup>The archive can be found at [http://www.davidrozas.com/lab/drupal\\_planet\\_archive.php](http://www.davidrozas.com/lab/drupal_planet_archive.php). The source code was released under at GPLv3 license, and can be found at [https://github.com/drozas/drupal\\_planet\\_archive](https://github.com/drozas/drupal_planet_archive).

as groups.drupal.org, localise.drupal.org or assoc.drupal.org among others. A sample of profiles from 73 ‘Drupalistas’ (the term for members of the Drupal community) were inspected.

Finally, four semi-structured interviews were conducted from 6 July to 23 August 2014 with respondents who had various Drupal roles and degrees of experience.

## 3 Findings

### 3.1 Contributions beyond source code

Two main types of contribution activities emerged from the case study. The first was “object-oriented” contributions, encompassing all those activities whose focus of action is objects, for example source code, documentation and translations. The second category is “community-oriented” contributions, those in which the focus of action is directed towards the community. Examples are the organisation and participation in face-to-face events, activities related to supporting other users, and mentoring. The importance of “community-oriented” activities is suggested by a veteran Drupalista, who writes in his personal blog:

“[...]It only stands to reason that my perspective on Drupal is one that is Community driven. When I think of Drupal, I think of the Drupal community.”

Drupal developer, 6 years<sup>7</sup> Retrieved 20 September 2014, from <http://dougvan.com/blog/drupal-community-and-there-happens-be-piece-software-same-name>.

Similar views were also expressed during the interviews. For example, when asked about the meaning of Drupal, I<sub>3</sub> explained:

“[...]it’s [referring to Drupal] the community in which I spend most of my time. When I wake up, the first thing I do in the morning is check the Telegram’s group which we are in [referring to an instant messaging group of Spanish Drupalistas], to see what people have been talking about. When I arrive at the office, the first thing that starts up is the Internet Relay Chat client connecting to the Drupal channels.”

Drupal developer, 7 years. Original reply in Spanish.

Table 1 provides a summary of the contribution activities identified in this study. The categories are based on the analysis of all the data collected. They are firstly classified according to the main categories previously discussed: “object-oriented” (G<sub>1</sub>) and

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<sup>7</sup>The attributions under the excerpts refers to the main role(s) of the Drupalistas and the age of their accounts at Drupal.org.

“community-oriented” ( $G_2$ ). Contribution activities related to source code ( $SG_{1.1}$ ) are further classified into two subgroups: core ( $SG_{1.1.1}$ ) and contributed ( $SG_{1.1.2}$ ). Core modules are those which form part of the default download of Drupal, and can be seen as its kernel. Contributed modules are those which are available at the official collaboration platform, but are not part of the core. They can be seen as “plugins”. The reason for this distinction is the significant differences found in the type of dynamics and contribution activities that occur within these two ecosystems of modules, although the type of object is the same: source code. The possibility to perform modifications in the digital commons for the core group is more formalised, harder to achieve, and more specialised. As a consequence, new contribution activities emerge. For example, the “creation of summaries of the issues”, in which hundreds of comments are summarised, is perceived as a valuable contribution. This type of contribution is typically carried out by newer members to save the core developers having to go through the whole list. It is encouraged as a way to “contribute to core”, while enabling the newest members to become familiar with the organisational processes and the technicalities.

In a similar way, within the “community-oriented” group ( $G_2$ ), a distinction is made with regard to the contribution activities related to the organisation and participation in face-to-face events ( $SG_{2.5}$ ). In this case, they are differentiated by their scope. The second of these subgroups ( $SG_{2.5.2}$ ) includes regional, national and role-specific events. This is because the dynamics, organisational processes and identified contribution activities in these events are similar. As in the case of the subgroup  $SG_{1.1}$ , the main difference between  $SG_{2.5.1}$  and  $SG_{2.5.2}$  is with regard to its level of formalisation and the ease of participation in their organisation. For example, DrupalCon activities, largely organised by the most formal institution within the Drupal community, the Drupal Association, are at the formal end of the spectrum.

Object-oriented ( $G_1$ )	Source code ( $SG_{1.1}$ )	Core modules and themes ( $SG_{1.1.1}$ )	Lead development initiatives
			Participate in development initiatives
			Submission of patches
			Review and test patches
			Summarise issues
		Report bugs	
	Contributed modules, distributions or themes ( $SG_{1.1.2}$ )	Maintain project (e.g. review of patches, porting it to a newer core version, add new features, etc.)	
		Review new applications	
		Report bugs	
	Documentation at Drupal.org ( $SG_{1.2}$ )	Write documentation	Moderate documentation
			Report issues with documentation (e.g. SPAM)
			Provide translation strings
			Review/approve translation strings
Translation ( $SG_{1.3}$ )	Translation group management	User interface design	
		User experience	
		Design of logos, style guides, etc.	
Design ( $SG_{1.4}$ )	Provide specific support to other users through the official platform (e.g. forums, chats, etc.)		
Usage and support ( $SG_{2.1}$ )			

	Provide specific support to others through other platforms (e.g. drupal.stackexchange.com)	
	Provide generic advises (e.g. "recipees" about how to build certain functionality, experience with certain modules, etc.)	
Evangelisation (SG <sub>2.2</sub> )	Create Drupal related materials (e.g. blog posts, videos, podcasts, etc.)	
	"Spread the word" of Drupal in a day-by-day basis (e.g. talk about Drupal with colleagues, promote Drupal in FLOSS conferences, etc.)	
	Create initiatives around the Drupal ecosystem (e.g. Drupical.com, Drupal-fund.us, etc.)	
	Marketing research and branding	
Training and mentoring (SG <sub>2.3</sub> )	Creation of training materials (e.g.: drupallader.org)	
	Mentoring contributors (e.g. Core mentoring, students from Google Summer of Code, etc.)	
Online community management (SG <sub>2.4</sub> )	Participation in Drupal.org Content Working Group (e.g. curation, moderation, etc.)	
	Participation in Drupal.org software Working Group (e.g. tasks related to the maintenance of the software run at the main collaboration platform)	
	Participation in Drupal.org infrastructure Working Group (e.g. tasks related to server administration)	
	Participation in groups.drupal.org (e.g. local groups, legal support, conflict resolution, etc.)	
Organisation and participation in face-to-face events (SG <sub>2.5</sub> )	Local events (SG <sub>2.5.1</sub> )	Organisation of the event (e.g. logistics)
		Give talks, run workshops, etc.
		Attendance to the event
	DrupalCamps / Drupal Dev Days / Frontend United and other regional or role-specific events (SG <sub>2.5.2</sub> )	Organisation of the event (e.g. logistics, selection of presentations, etc.)
		Creation of the website, social media management, etc.
		Prepare a presentation
		Run a BoF (Birds Of a Feather)
		Attendance to the event
	DrupalCon (SG <sub>2.5.3</sub> )	Organisation of the event (e.g. logistics, selection of presentations, etc.)
		Creation of the website, social media management, etc.
		Coordination of the local community with the Drupal Association
		Volunteering in the event (e.g. provide assistance to find rooms, registration desks, etc.)

		Prepare a presentation
		Run a BoF
		Participate in Code Sprints
		Participate in Community Summit
		Participate in “Tour de Drupal”
		Organisation of social events (e.g. Drupal Trivia night)
	Economic sustainability (SG <sub>2.6</sub> )	Become a member of the Drupal Association
		Donation to the Drupal Association
		Donate to crowdfunding campaigns for core or contrib modules
		Sponsorship of face-to-face events

**Table 1.** List of identified types of contributions

A comment from I<sub>3</sub> illustrates how the participation and organisation of local face-to-face events are indeed understood as a contribution for Drupalistas:

“[...]organise talks, meetups or just hang out with Drupalistas to drink some beers and have a talk, are also very important activities, and very positive for the community.”

Drupal developer, 7 years. Original reply in Spanish.

Similarly, the following excerpt from the field notes illustrates how some Drupalistas identify the participation and organisation of offline events as contributions, as well as their contributions’ lack of visibility with respect to other activities:

“[.]She explained to me that we, as a community, are not aware sometimes of the relevance that other activities have, such as the organisation of events like this one [referring to the DrupalCamp] or the ‘Tour de Drupal’<sup>8</sup>. She said: ‘Organising and attending events like this one are definitely types of contribution, but they are not so popular. We tend to think a lot in contributing code, especially to core. But, thanks to things like this, the community is very healthy’.”

Drupal themer, 4 years. Extracted from full field notes during the participant observation at DrupalCamp North East 2014.

These perceptions of what can be considered contribution contrast with those represented in the main collaboration platform. Not surprisingly for a FLOSS community with a strong “code-centric” character (Zilouchian Moghaddam et al., 2011; Sims, 2013), there is a mismatch between these perceptions of the importance of “community-oriented”

<sup>8</sup> “Tour de Drupal” (<http://touredrupal.org/>) is an initiative of Drupalistas to cycle together during several days to the city in which the DrupalCon is held. It was organised for the first time for DrupalCon Europe 2014, when people cycled from several European cities to Amsterdam (<http://vimeo.com/107816807>).

activities and those “officially” reflected in the main collaboration platform. This mismatch is illustrated in the main pages that explain how individuals could contribute to Drupal.

On the one hand, all the categories identified as “object-oriented” ( $G_1$ ) are represented in the “Get Involved” page<sup>9</sup> relating to contribution in the main collaboration platform. Some of them are differentiated and highlighted. For example, in the case of contribution activities related to source code ( $SG_{1.1}$ ), there is an explicit distinction between ‘theming’ and ‘backend’ development.

On the other hand, “community-oriented” activities ( $G_2$ ) are only partially reflected in user support, donations and marketing. For example, a sub-page named “Contribute to Drupal.org”<sup>10</sup>, provides information about contributions related to the main collaboration platform itself. This area refers to some of the “online community management” ( $SG_{2.4}$ ) contributions. However, no explicit mention is made of the “organisation and participation in face-to-face events” ( $SG_{2.5}$ ). The first reference can be found only after navigating through a secondary link in the “General Resources” section to the Drupal Groups<sup>11</sup>. This allows the user to start browsing by geographical criteria after several steps, where the first references to the organisation of events can be found.

The main aim in this initial section has been to argue for the need to widen our understanding of contribution activities beyond the traditional view of source code or other “object-oriented” activities, and to provide evidence that “community-oriented” activities lack visibility at the main collaboration platform. This lack of visibility can also be found in user profiles, as argued in the next section.

### 3.2 Representation of contribution activities in user profiles

User profiles have been previously identified as a key element in the generation of perceptions by other users in FLOSS communities (Marlow, Dabbish & Herbsleb, 2013). They are an important source of public references, used to evaluate the reputation of other members, and play a significant role in the process of status attainment in FLOSS communities (Stewart, 2005).

The importance of user profiles at Drupal.org was confirmed in the interviews, and by observation and documentary analysis.  $I_4$  highlights the importance of user profiles when hiring services from other Drupalistas:

“[...]We always go and check to see if they have got a Drupal.org account and check what contributions they have made before, and whatever. It kind of gives you the sense of, you know, who you are gonna be dealing with.”

Drupal themer and developer, 11 years.

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<sup>9</sup><https://drupal.org/contribute>, accessed on 11 November 2014.

<sup>10</sup><https://drupal.org/contribute/drupalorg>, accessed on 11 November 2014.

<sup>11</sup><https://groups.drupal.org/>, accessed on 11 November 2014.

Another example is that the representation of certain contribution activities in the profile can be a motivator:

“[..]She got her first patch committed to core. She was very enthusiastically showing her friend her profile at Drupal.org because in the ‘Projects’ section appears ‘Drupal core (1 commit)’.”

Drupal marketer and site builder, 2 years. Extracted from full field notes during the participant observation at DrupalCon Amsterdam 2014.

The list below presents a summary of profile elements in relation to each category presented in the previous subsection. Activities fully represented are indicated with the key [F], those which are partially represented with the key [P], and those not represented with the key [N]. For those which are represented, the items employed and the quantification of the activities, if any, are detailed. The nomenclature for the groups and subgroups is the same as previously employed in table 1.

- Object-oriented ( $G_1$ ):

- Source code ( $SG_{1.1}$ )[F]: represented in the main profile by six checkbox items: “I contributed Drupal modules”, “I contributed Drupal themes”, “I reviewed project applications”, etc. (see figure 1). They are sorted by projects (including core), and quantified by number of commits (see figure 2).
- Documentation ( $SG_{1.2}$ )[F]: represented in the main profile by a checkbox item “I contributed Drupal documentation” (see figure 1), and quantified by number of editions (see figure 2). Additionally, they are also present in the secondary tab Posts (see figure 3).
- Translation ( $SG_{1.3}$ )[F]: represented in the main profile by a checkbox item “I contributed Drupal translations” (see figure 1), and quantified by the number of editions approved in a secondary profile at [localize.drupal.org](http://localize.drupal.org) (see figure 4).
- Design ( $SG_{1.4}$ )[N]: not directly represented. However, some users check the option “I contribute to Drupal.org” (see figure 1) to include this contribution subgroup.

- Community-oriented ( $G_2$ ):

- Usage and support ( $SG_{2.1}$ )[P]: partially represented in the main profile for the internal forums by the checkbox item “I help in the Drupal support forums” (see figure 1). They are not explicitly quantified, but they are present in the secondary tab “Posts” (see figure 3).
- Evangelisation ( $SG_{2.2}$ )[P]: most of the activities are not represented, with the exception of participation in some FLOSS conferences<sup>12</sup> in 2005 and 2007 (see

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<sup>12</sup>The events FOSDEM (Free and Open Source Software Developers’ European Meeting) and OSCOM (Open Source CMS Conference) depicted in figure 1 have a wider FLOSS audience than Drupal. Participation in these events is included under the “Evangelisation” category, since Drupalistas referred to these events as a way to promote the use of Drupal within the wider FLOSS community. These contribution activities should not be confused with the ones of the subsequent category: “Organisation and participation in face-to-face events”. The latter refers to participating and organisation of Drupal specific events.

- figure 1). Nonetheless, some Drupalistas use the open fields “Bio” or “Contributions” to describe this type of activity in a wider way (see figure 5).
- Training and mentoring (SG<sub>2.3</sub>)[F]: represented in the main profile by the checkbox item “I help mentor new contributors” (see figure 1), and the possibility for mentees of adding the usernames of their mentors (see figure 6). Moreover, some Drupalistas use the open fields<sup>13</sup> “Bio” or “Contributions” to describe this type of activity (see figure 7).
  - Online community management (SG<sub>2.4</sub>)[P]: not directly represented in the main profile. Nevertheless, some users check the option “I contribute to Drupal.org” or “I contribute to Drupal issue queues” to include this (see figure 1). They are not explicitly quantified, but they are present in the secondary tab “Posts” (see figure 3). In addition, the profile at the secondary site, groups.drupal.org, lists the groups which the user has joined, votes for proposed topics, the number of groups as organiser, and the number of events created and/or co-organised (see figure 8).
  - Organisation and participation in face-to-face events (SG<sub>2.5</sub>):
    - \* Local events (SG<sub>2.5.1</sub>)[N]: not represented. Notwithstanding, some Drupalistas use the open fields “Bio” or “Contributions” to describe this type of activity (see figure 7).
    - \* DrupalCamps/Drupal Dev Days/Frontend United and other regional or role-specific events (SG<sub>2.5.2</sub>)[N]: not represented. However, some Drupalistas use the open fields “Bio” or “Contributions” to describe this type of activity (see figure 7).
    - \* DrupalCon (SG<sub>2.5.3</sub>)[P]: partially represented in terms of attendance or organisation (generic). Participation is represented by several checkboxes for the specific events (e.g. “I attended DrupalCon Amsterdam 2014”), while organising is represented through a single checkbox: “I helped to organize DrupalCon” (see figure 1). Furthermore, some Drupalistas use the open fields “Bio” or “Contributions” to describe in greater detail their specific contributions (see figure 7).
  - Economic sustainability (SG<sub>2.6</sub>)[P]: partially represented in the main profile by a badge depending on the type of affiliation to the Drupal Association: individual member, organisational member, etc. (see figure 9).

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<sup>13</sup>Open fields refer to HTML input textboxes, in which the Drupalistas can write a text, rather than select between a predetermined set of options.

Put each item on a separate line or separate them by commas. No HTML allowed.

- I contributed Drupal patches
- I contributed Drupal modules
- I contributed Drupal themes
- I contributed Drupal installation profiles
- I contributed to Drupal issue queues
- I contributed to Drupal.org
- I contributed Drupal documentation
- I contributed Drupal translations
- I helped organize DrupalCon
- I contributed Drupal automated tests
- I reviewed Project applications
- I help in the Drupal support forums
- I provide Drupal-related services
- I help mentor new contributors
- I attended the Drupal conference at FOSDEM 2005 (Antwerp, Belgium)
- I attended OSCON 2005 or the off-site Drupal conference at OSCON 2005 (Portland, Oregon)
- I attended LinuxWorldExpo London
- I attended DrupalCon Amsterdam 2005
- I attended the Drupal conference colocated with the Open Source CMS and Blogging Tools Summit (Vancouver, Canada)
- I attended the Drupal conference 2006 (Brussels, Belgium)
- I attended OSCMS 2007, Sunnyvale
- I attended DrupalCon Barcelona 2007
- I attended DrupalCon Boston 2008
- I attended DrupalCon Szeged, Hungary 2008
- I attended DrupalCon DC 2009
- I attended DrupalCon Paris 2009
- I attended DrupalCon San Francisco 2010
- I attended DrupalCon Copenhagen 2010
- I attended DrupalCon Chicago 2011
- I attended DrupalCon London 2011
- I attended DrupalCon Denver 2012
- I attended DrupalCon Munich 2012
- I attended DrupalCon Portland 2013
- I attended DrupalCon Sydney 2013
- I attended DrupalCon Prague 2013
- I attended DrupalCon Austin 2014
- I attended DrupalCon Amsterdam 2014
- I will attend DrupalCon Latin America 2015
- I will attend DrupalCon Los Angeles 2015
- I will attend DrupalCon Barcelona 2015

**Figure 1.** List of contribution activities in the “Drupal” section of the researcher’s profile. Retrieved 22 October 2014, from <https://www.drupal.org/user/740628/edit/Drupal> (not available unless logged in), under a CC BY-SA 2.0 license.

**History**

**Member for** 9 years 5 months

**Documentation** Over 1000 edits

**Projects**

- [Drupal core](#) (6486 commits)
- [Poll \(from core\)](#) (2557 commits)
- [Spark](#) (160 commits)
- [Quiz](#) (102 commits)
- [Drupal Module Upgrader](#) (92 commits)
- [Pants](#) (76 commits)
- [Revision Moderation](#) (74 commits)
- [Organic groups](#) (72 commits)
- [Documentation](#) (60 commits)
- [Webchick's test profile](#) (52 commits)
- [Drupal 7 to 8 Module Upgrader \[dead\]](#) (51 commits)

**Figure 2.** Example of quantified contributions to source code and documentation. Retrieved 5 November 2014, from <https://www.drupal.org/u/webchick>, under a CC BY-SA 2.0 license.

Type	Title	Author	Replies	Last updated
Issue	<a href="#">Typo causes WSOD on theme generate</a> <b>new</b>	<a href="#">clivesj</a>	10 10 <b>new</b>	1 min 24 sec ago
Forum topic	<a href="#">FAQ on SA-CORE-2014-005</a> <b>updated</b>	<a href="#">greggles</a>	221 220 <b>new</b>	42 min 36 sec ago
Forum topic	<a href="#">Drupal 7: not showing uploaded photos and files</a>	<a href="#">digibill</a>	36 1 <b>new</b>	11 hours 40 min ago
Issue	<a href="#">Notice: Undefined variable: _POST in include() (line 1 [...].html.tpl.php)</a> <b>new</b>	<a href="#">gravisrs</a>	26 26 <b>new</b>	2 days 20 hours ago
Issue	<a href="#">Add a special -none- country entry in the "Available countries" list in order to make the address field really optional.</a> <b>new</b>	<a href="#">scor</a>	166 2 <b>new</b>	3 days 23 hours ago
Issue	<a href="#">[META] Drupal 8 - Roadmap and Update</a> <b>new</b>	<a href="#">kingfisher64</a>	33 3 <b>new</b>	6 days 5 hours ago
Book page	<a href="#">Menu block (Drupal 6)</a> <b>new</b>	<a href="#">JohnAlbin</a>	8	1 week 4 days ago

**Figure 3.** Example of list of posts listed in the tab “Posts” of the user profile. Retrieved 5 November 2014, from <https://www.drupal.org/user/338895/track>, under a CC BY-SA 2.0 license.

Localization contributions	
<b>Spanish</b>	1124 approved translations
History	
<b>Member for</b>	4 years 4 weeks
<b>Primary profile</b>	<a href="https://www.drupal.org/">Profile on https://www.drupal.org/</a>

**Figure 4.** Example of quantified contributions related to translation activities. Retrieved 5 November 2014, from <https://localize.drupal.org/user/311048>, under a CC BY-SA 2.0 license.

**Bio:**  
 Designer, Themer, and general Drupal solutions guy for Mustardseed Media Inc. More commonly known as "that video podcast guy".

**Figure 5.** Example of use of the open field “Bio” to display contributions about evangelisation activities. Retrieved 5 November 2014, from <https://www.drupal.org/u/rob.feature>, under a CC BY-SA 2.0 license.

Drupal	
<b>My mentors</b>	<a href="#">JohnAlbin</a> , <a href="#">Bojhan</a> , <a href="#">webchick</a> , <a href="#">nod_</a> , <a href="#">berdir</a>

**Figure 6.** Example of the use of the field mentors, to acknowledge mentorship contributions in a peer-to-peer way. Retrieved 5 November 2014, from <https://www.drupal.org/u/lewisnyman>, under a CC BY-SA 2.0 license.

**Bio:**

Read more at [www.chandeepkhosa.com](http://www.chandeepkhosa.com), email [hello@chandeepkhosa.com](mailto:hello@chandeepkhosa.com), or call 07962 382 442.

I am a freelance Drupal Site Builder & Front End Developer looking for new freelance projects in London and have been developing websites with Drupal since 2007.

I have been very involved in training and mentoring web developers, particularly young people, getting them into careers specialising in Drupal. I have helped to support the Drupal community by speaking at camps and conferences on topics including e-Commerce & responsive web design.

-- Drupal community --

- ☆ Founding & organising Drupal West London
- ☆ Mentoring apprentices & creating open source curriculum for learning Drupal - Open Drupal
- ☆ Speaking at Drupal camps on Drupal Commerce, Responsive web design & Open Drupal <http://chandeepkhosa.com?q=speaker>
- ☆ Organising & facilitating a BoF (birds of a feather) session at DrupalCon Amsterdam 2014 <https://amsterdam2014.drupal.org/bof/open-drupal-drupal-apprenticeships-...>
- ☆ Contributing & reviewing front end patches during sprints at Drupal Dev Days Szeged, Drupalaton & DrupalCon Amsterdam

**Figure 7.** Example of the use of the open field “Bio” to display contributions about mentoring and face-to-face events activities. Retrieved 5 November 2014, from <https://www.drupal.org/u/chandeepkhosa>, under a CC BY-SA 2.0 license.

**History**

<b>Number of times voted</b>	114
<b>Co-organized events</b>	92
<b>Submitted events</b>	98
<b>Organizer of groups</b>	5
<b>Member for</b>	7 years 17 weeks
<b>Primary profile</b>	<a href="https://www.drupal.org/">Profile on https://www.drupal.org/</a>

**Figure 8.** Example of quantified contributions related to online community management activities. Retrieved 5 November 2014, from <https://groups.drupal.org/user/8713>, under a CC BY-SA 2.0 license.

United Kingdom

**Current Role(s):**  
Drupal Director

**CTIDIGITAL**

IRC: pdjohnson  
<http://www.pauldjohnson.co.uk>

**Professional Info**

**Companies Worked For**  
British Council, NHS, Manchester United, Nike, Vodafone, Linpac, Daler Rowney, Clive Christian, Aldi, [Drupal Association](#), DrupalCon, Interflora

Drupal Association  
Individual Member

Drupal Association  
Supporting Partner

Drupal Association  
Organization Member

pdjohnson helps support and grow the Drupal community with the [Drupal Association](#).

**Figure 9.** Example of badges provided by the Drupal Association. Retrieved 5 November 2014, from <https://www.drupal.org/u/pdjohnson>, under a CC BY-SA 2.0 license.

This list shows an uneven representation of the contribution activities in user profiles at Drupal.org. This affects the activities within the “community-oriented” category ( $G_2$ ) far more than those in the “object-oriented” category ( $G_1$ ). The one exception is “design” ( $SG_{1.4}$ ). This lack of representation affects especially those involved with the organisation and participation in local ( $SG_{2.5.1}$ ) or regional/role-oriented events ( $SG_{2.5.2}$ ). Some Drupalistas use generic open text fields, such as “Bio”, to overcome these limitations, in order to have these traditionally less visible contributions publicly acknowledged.

### 3.3 “Come for the software, stay for the community”: the role of affective labour in the Drupal community

A strong sense of community is often mentioned by Drupalistas. This sense of community is even present in Drupal’s main motto: “Come for the software, stay for the community”<sup>14</sup>. However, the mechanisms that enable the creation of this sense of community are less clear.

In this subsection, the focus is placed on the organisation and participation in face-to-face events, since they emerged as the clearest example of how this sense of community is created. This is conceptualised drawing on the concept of affective labour (Hardt, 1999). By affecting the emotional experiences of Drupalistas, in a variety of ways depending on their experience, these contribution activities play a relevant role in the sustainability of the community, although they are less visible in terms of its representation.

<sup>14</sup>See <https://www.drupal.org/>, accessed on 30 April 2014.

Many outcomes that can be interpreted as affective labour from these contribution activities were found. However, a significant difference in perception was found depending on the degree of experience of the Drupalista.

Participation in face-to-face events was commonly described by new members as a way to humanise the community. Drupal is regarded not just as “a piece of software”, but rather a community in which Drupalistas become commoners through “commoning” (Linebaugh, 2008). The following excerpt from I<sub>2</sub>, while reflecting on how the attendance to local meetings changed his emotional experiences, illustrates this:

“[...]indeed, the fact of attending these meetups was really good. Because you realise there are people behind the source code, right? There are people behind the modules. And you meet people that can tell you a kind of personal story.[...] And then, it stops being something anonymous, it becomes something yours.”

Drupal developer and devop, 1.5 years. Original reply in Spanish.

Another common outcome of participation for new members was help with avoiding barriers, and increasing the will to contribute. The following excerpt from a new member after attending a DrupalCamp for the first time illustrates this type of outcome:

“Walking in the door, I didn’t feel like a part of the community. I wasn’t sure where I fit in since I wasn’t a developer, designer, or vendor. I wasn’t sure what to expect at the NYC Camp[...].

[After participating in the event] I never got a sense of feeling inferior for lack of experience or an inability to code. We had really engaging and valuable sessions. [...] The experience came together for me during several discussions both in the sessions and on the side. Drupal is about community. The community builds, maintains, advocates, cautions, and develops the platform. [...] For me, this triggered the idea of giving back to the community in a way that made sense for us.”

Drupal project manager, 1 year. Retrieved 22 May 2014, from <https://assoc.drupal.org/content/guest-post-why-olympus-gives-back-drupal>. Drupal Association.

As the engagement with the commons increases, affectionate relationships develop, to the point of friendship in some cases. A veteran Drupalista, I<sub>3</sub>, described the role of face-to-face “meetups” to form friendships:

“[...]friendships are developed, and seeing people in-person helps a lot. I believe the idea of having face-to-face meetups and getting to know each other in-person is essential.[...] In the IRC [Internet Relay Chat] you will talk about certain things, but after a day cycling 50 or 60 kilometres [referring to the ‘Tour de Drupal’<sup>15</sup>], when you go to have dinner with that person, probably the conversation topics might be different... or the same. But there will be more interaction for sure, and a greater friendship [...]”

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<sup>15</sup>See footnote 8.

Drupal developer, 7 years. Original reply in Spanish.

These relationships remain afterwards, even if the Drupalistas are in different locations or do not have the chance to see each other very often. When asked about the establishment of relationships in the Drupal community, I<sub>4</sub> explained:

“I have got really good friendships with people. And I have got a lot of people I am kind of actively in touch with all the time. But there is also this thing I feel like... I have got friends who are, you know, old friends I have known in the Drupal community, that I haven't seen for a long time. [...] But if they were just to pop up on my doorstep, it would just be like carrying on from where we left off. And I get that feeling with a lot of people within the Drupal community as well. You know, it is like... we are such close friends that, we don't need to continue to keep in touch.”

Drupal themer and developer, 11 years.

Furthermore, local activities become more critical as the community grows, allowing the sense of community to scale up. I<sub>4</sub> expressed how, since the Drupal community has been constantly growing, the emergence of more but smaller local communities enables the maintenance of this sense of community:

“Because the community is growing, then you have less of a sense of community. But I think the solution to that is to have smaller local communities. So, you know, as the worldwide community grows, then you start finding, like whereas before it might have been 50 people worldwide, now you have like 50 people in your part of London, or wherever.”

Drupal themer and developer, 11 years.

This subsection has focussed on the organisation of face-to-face events as an illustration of the existence and relevance of affective labour in the Drupal community. These events emerged as the most prominent source of affective labour during the study. Hence, it is not only that “community-oriented” activities such as these are understood as a type of contribution, as shown in subsection 3.1; nor is it only that they are unequally represented in the main collaboration platform, as presented in subsection 3.2; but they play a key role in the sustainability of the community, as shown in this subsection. They provide emotional experiences for their participants and help to foster collaboration.

## 4 Discussion

Previous research on FLOSS communities has shed light on the importance of face-to-face events in these communities. For instance, in her ethnographic study of hacker culture using the FLOSS Debian community as a case study, Coleman described the relationship

between the conference (DebConfs) and the public as having “affective, moral, economic, and political dimensions” (Coleman, 2013, pp. 71-73). She described the importance of these conferences to foster collaboration. They created the basis for social solidarity and for the establishment and sustainability of relationships: “[...] people embark on decisions and actions they probably would not have considered otherwise. Some hackers decide to formally apply to become a Debian developer, while longtime developers decide not to quit the project”. This study provides additional evidence of the importance of such activities, but extends this by arguing how they are understood as relevant contributions.

A similar result was found in Nordin’s (2014) mixed-methods study of the Drupal community, which was carried out at almost the same time as the one presented in this paper. Nordin focussed on the motivations to contribute, to provide a set of guidelines to improve Drupal.org. She concluded that “metrics such as code commits used to gauge contribution by Open Source literature and by Drupal.org itself paint an incomplete picture of the types of contributions that actually happen in the Drupal project” (Nordin, 2014, p. 43).

The findings presented in this study provide further evidence of the role which less visible contributions, such as the organisation and participation in face-to-face local events, play in transforming emotional experiences, as well as helping to scale up the sense of community.

Furthermore, by drawing on the concept of “affective labour”, this study connects the findings with the larger literature on the commons. Participation in the Drupal community “transforms the local subjectivities” of Drupalistas, in a way reminiscent of Singh (2013), in her research on community-based forests in India. By looking at an extreme “code-centric” case study, this research provides additional empirical evidence of the importance of affective labour in CBPP communities, which was argued by Bollier (2014) to be its “lifeblood”.

The lack of representation of affective labour cannot be understood as only due to socio-cultural reasons. The “code-centric” character of the community offers only a partial explanation. Technical limitations also have a major impact. For example, while certain activities are easily quantifiable (e.g. the number of commits of source code, or the number of editions of wiki pages), others are more difficult to quantify or represent in concise, useful ways. In some cases, although indicators are available, the information is out of the scope of and therefore not reflected in the main collaboration platform. For example, external platforms such as Meetup.com, commonly employed for the organisation of local events, provide an account of the number of events attended and organised by a certain user. Nevertheless, this information is stored in proprietary third-party platforms and therefore absent from Drupal.org.

However, the main limitation is in the difficulty of providing indicators to measure the value of some types of contribution in CBPP communities. The Drupal community itself is attempting to find suitable indicators. For example, there is an ongoing initiative<sup>16</sup> to improve how activities are represented in user profiles at Drupal.org, to “[...] go beyond code creation activity and into more community-oriented stuff, since that’s also a huge part of what makes Drupal healthy.”, and some of the elements (such as the peer-to-peer

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<sup>16</sup>See <https://www.drupal.org/node/2305759>, accessed on 15 September 2014.

mentorship references illustrated in figure 6) indicate the will to follow that direction<sup>17</sup>.

This issue should be understood within the wider context of CBPP, and the need to enhance and expand the conceptualisation and measurement of value in these communities, as well as its incorporation into the socio-technical systems employed to support their organisation. However, it becomes especially relevant in large and global communities as they scale up. Due to their growth and their global character, the generation of perceptions between unknown members becomes more frequent in these communities, and the role of the platforms employed to support their self-organisation becomes more relevant. Research projects such as P2Pvalue<sup>18</sup> and initiatives such as Sabir (De Filippi & Hassan, 2014) are currently exploring how value is generated in CBPP communities, and how to aggregate and distribute it within and beyond the CBPP community network.

## 5 Conclusion

By focussing on an extreme “code-centric” case study, the findings presented in this research expose the need to broaden our understanding of contribution activities in FLOSS communities beyond the most easily quantifiable and “object-oriented” ones. The ethnographic approach taken showed how certain activities, whose focus is directed towards the community, are indeed understood as contributions. These activities foster collaboration, as well as having effects on the creation or modification of emotional experiences, varying according to the degree of experience of their participants.

Most of these contributions are poorly represented in the main collaboration platform as compared to the “object-oriented” ones. This unequal representation was found at an “official” level (e.g. the main sections of the platform dedicated to the contribution), as well as at an individual level. This disjunction between their relevance and their lack of visibility casts doubt on the “object-centric” myth illustrated in the motto “Talk is silver, code is gold”, which has been traditionally present in FLOSS communities.

These findings extend previous studies on FLOSS to connect it to the wider area of CBPP, drawing on the concept of affective labour. Through participation in “commoning” processes, the subjectivities of participants are transformed.

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<sup>17</sup>Indeed, a new version of user profiles (see <https://www.drupal.org/user/>, accessed on 24 February 2015) was released months after this study concluded, confirming the willing to advance in that direction. For example, the mentorship relationships depicted in figure 6 are now highlighted by including their pictures, and they are quantified as well reversely, by listing the number of users who list that profile as a mentor.

<sup>18</sup><http://www.p2pvalue.eu/>

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