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THILO VOIGT
BACHELOR THESIS

EPISODIC VOLUNTEERING
IN OPEN SOURCE

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Abstract

Episodic volunteers work irregularly and very often for only a short time. The frequency of this phenomenon is recently increasing in non-profit organizations. This is a change in volunteer behavior, that influences volunteer management. Is this type of volunteering also present in open source organizations? We will show, that episodic volunteers are present in open source projects. Further we shed light on their fields of work, needs and organizational changes they cause. We use an exploratory case study, analyzing interviews with volunteer managers and public data on the topic. Open source organizations need to be aware of the phenomenon and adjust their volunteer management strategy to accommodate episodic volunteers.

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1 Introduction

1.1 Thesis goal

Episodic volunteers are volunteers, who prefer time-discrete and short term assignments rather than long period assignments. This is a trend, affecting traditional non-profit organisations.

The goal of this research is to find out, to what extend episodic volunteers are present in open source projects. Capraro (2013) found a significant amount of contributions in filling out bug reports, coming from this kind of volunteers. Is this similar for other forms of participation in open source development? Ma et al. (2013) show, that in an 80 per cent majority, code developers have a short activity span. Have community managers observed a changing trend in recent years, concerning volunteer behaviour?

1.2 Changes to thesis goals

The goals of this thesis did broaden to include possible organizational changes resulting from episodic volunteer participation. In addition we took a look at the reasons of volunteers contributing episodically and the demographic distribution of this type of volunteer.

2 Research Chapter

2.1 Introduction

Volunteering has been the main drive and workforce for many public and non-profit organizations which are important for environmental and social work. Whether it is Greenpeace or just the local homeless shelter, volunteers are contributing valuable work hours for a good cause. Often, volunteer work is the only reason these organizations exist and the main reason they can do their work in the future.

In recent years a new development has been noticed: episodic volunteering. This special type of volunteer invests less time in their engagement. They commit a day, a week or a month and then disappear (Cnaan & Handy, 2005). This kind of involvement is sometimes one-off, meaning they do not come back. But many times, they bounce-back after a while and return to the previous (or another) organization to continue voluntary work (Macduff, 1990).

This phenomenon is growing in numbers. Therefore the average time invested per volunteer decreases (shown by statistics from America and Australia) but the number of volunteers in total is growing (Bryen & Madden, 2006).

Open source software mainly consist of volunteer work for code development, translations and bug tracking. Hence, these projects are greatly affected by any change in the work and commitment behaviour of volunteers.

2.1.1 Contributions

We did an exploratory two-organization case study with semi-structured interviews of experienced volunteer managers from two open source organizations.

- We will answer the question if episodic volunteers are present and welcome in open source projects.

- We will describe in detail the involvement of episodic volunteers in open source projects and shed light on the needs of these volunteers and the resulting changes in organizations, they contribute in.

2.1.2 Thesis layout

The thesis is structured as follows:

Chapter 2.2 outlines related works about open source and episodic volunteering. Used methodology is described with the research questions in chapter 2.3, followed by the research approach in chapter 2.4. Used data sources are listed in chapter 2.5. The core of the thesis, the research results are presented in chapter 2.6. Limitations in chapter 2.7 and the conclusion in chapter 2.8 round up the thesis. Elaborations on the research and choice of methods are explained in chapter 3.

2.2 Related Work

2.2.1 Open Source

"Free software means software, that respects users' freedom and community. Roughly, it means that the users have the freedom to run, copy, distribute, study, change and improve the software. Thus, 'free software' is a matter of liberty, not price. To understand the concept, you should think of 'free' as in 'free speech,' not as in 'free beer'." (Richard M. Stallman, `www.gnu.org/philosophy/free-sw.html`).

A lot of volunteers are present in open source development. A magnitude larger than the amount of core members of a given project will repair defects and a group another magnitude larger will report these problems (Mockus, Fielding, & Herbsleb, 2002).

There are multiple areas where submissions of different kinds are needed. Code contributions and bug reports are most common, but test cases and documents are also important fields of work for volunteers (Gacek & Arief, 2004).

A key asset of open source development is the via internet always accessible code repository (Ma et al., 2013). Distributed version control systems (like Git) provide further benefits like accurate metrics about the growth of the community and its software processes (Rodriguez-Bustos & Aponte, 2012).

A commit is the smallest unit of contribution to the source code in those systems. Kolassa et al. (2013) show, that these commits in open source development are most of the time very small and modeled best with a Pareto Distribution. That means, that in less likely cases, big contributions are also made.

About a stable 50 per cent of contributions in open source organizations are coming from volunteer work. The other half consists of contributions executed during working hours, what means according to Riehle et al. (2014) that they are carried out by paid workers.

The success of an open source project is dependent on the ability to break into smaller components (Lerner & Tirole, 2002). This might be the case because a working group of developers is rarely bigger than 10 to 15 people (Mockus et al., 2002).

Another important factor is leadership provided with a vision and the ability to keep the project together (Lerner & Tirole, 2002). Leaders often evolve in stages from user to contributor and later to project leader (Riehle, 2014).

People-managing plays a vital role in open source software (Aberdour, 2007). This is the reason why volunteer managers are closely connected with volunteer behavior and notice changes early.

2.2.2   Episodic volunteering

There is some disagreement in the available literature, if episodic volunteering is a new phenomenon or not. Some think they might be an entire new breed of volunteer (Auld, 2004), but the general view is that episodic volunteering has always existed, but is now increasing in frequency for multiple reasons.

The journal Volunteering-Australia (2001) suggests, that it is not a new phenomenon, but has increased in recent years. Styers (2004) thinks, episodic volunteering is just a change in the population of volunteers. Danson (2003, p.37) says, that episodic volunteers "go from organization to organization getting involved in one-off events, then move to other events at other organizations". Another view found in the literature is, that most volunteer participation in general is discrete or episodic, rather than continuous or successive (Harrison, 1995).

Although some authors consider this a new phenomenon, episodic volunteering work has been existing for a long time. For example helping to build a storage

shed for a neighbour is also volunteer work that ends after the project is completed (Macduff, 2005).

The fact, that this phenomenon of short term commitments is becoming more dominant in traditional volunteer organizations can possibly be due to "peoples increasingly hectic lives and the professionalism of the non-profit workforce" (Bryen & Madden, 2006, p.1).

But it is very doubtful, that episodic volunteering is replacing traditional volunteer work all together. It is more dominant because people are planning volunteer work depending on their personal life situation (Macduff, 2005).

Bryen and Madden (2006, p.IV) define episodic volunteers as "[...] volunteers, who prefer short term volunteering assignments or specific projects." Episodic volunteers may be one-off contributors or they can bounce-back by returning for multiple assignments.

Episodic volunteers are being categorized in previous research with different results: Macduff (2005) identifies three main types of episodic volunteering: temporary, interim and occasional volunteering.

- Temporary: People investing only a short period of time, such as a day or a few hours.

- Interim: Volunteers giving time on a regular basis for a period of less than six months.

- Occasional: Volunteers providing service at regular intervals but for short periods of time (an example would be the commitment once a year to a specific recurring project).

While these categories give a well defined base to investigate and measure the phenomenon of episodic volunteering, there is some doubt by Bryen and Madden (2006) about the general validity of this categorisation.

Bryen (2006, p.21) for example interprets Mcduff's framework as an indication, that "[...] episodic volunteers may be located along a continuum that consists of long term volunteering at one end and short term at the other". Her approach is, that each volunteer uses the available flexibility of the volunteer organization or assignment to oscillate on this continuum as their current life situation permits.

Bryen and Madden (2006, p.30) on the other hand think, that their findings in a case study about a local volunteering organization challenge the classification by Mcduff. Their experience shows, that "episodic volunteers cannot easily be classified using Macduffs framework [...]". Instead, they suggest to use the motivational framework by Hustinx and Lammertyn (2003), which aligns better with their findings.

2.2.3 Motivation

Hustinx and Lammertyn (2003) built a motivational model to explain episodic behaviour of volunteers. They introduce two motivational key factors for volunteers in general:

- Collective: This type of volunteer often feels a responsibility to his local community and is deeply rooted in it. The goal of his work is to aid the common good in an ethical sense.

- Reflexive: The second type of volunteer is more self-oriented and commits his time to acquire knowledge or skills "and occurs on a more temporary and non-committal basis" (Hustinx & Lammertyn, 2003, p.168).

Temporary, interim or occasional episodic volunteering	Collective vs. Reflexive volunteering (Community vs personal needs)	Example
Occasional episodic	Collective	Selling flowers for the annual Daffodil Day with church friends
Temporary episodic	Collective	Joining work colleagues to raise funds through a golf tournament (one-off)
Interim episodic	Collective	Working for two months with a group of kindy parents to rebuild an outdoor play environment
Occasional episodic	Reflexive	Volunteer umpire for an annual soccer carnival
Temporary episodic	Reflexive	Guest speaker at youth shelter
Interim episodic	Reflexive	Student volunteer at aged care centre during summer semester (one-off)

Figure 2.1: A categorizational overview (Bryan and Madden 2006)

An approach to the concept of motivation by Warburton and Oppenheimer (2000) (as cited in Bryen & Madden, 2006, p.11) suggests, that time flexibility is a big concern by older volunteers and results in increased episodic behaviour.

Bryen and Madden (2006) found, that the motivation for volunteering was the desire to build companionship, to give back to their community and to engage in social interactions.

An article in Volunteering-Australia (2001, p.91) suggests, that changing demographics and trend towards short term project based commitment among young people, baby boomers and people of working age might influence the statistics.

2.2.4 Bounce-back

The returning of episodic volunteers to an organization for additional assignments is called bounce-back and is part of the model by Macduff (2005) in form of occasional volunteers (recurring projects).

The actual occurrence of bounce-back is qualitatively investigated by Bryen and Madden (2006). Their results show that bounce-back is dependent on the personal decision of people that felt valued, welcome and appreciated in an organization. Another supporting aspect is, when the organization is asking volunteers personally to come back and commit volunteer time again.

They further show that the high degree of satisfaction – of the wishes that motivated them in the first place – appeared to have a greater impact on bounce-back than organizational factors.

In contrast to the retention factors of traditional volunteers, the bounce-back of episodic ones (in the case of Bryen and Madden (2006)), is not significantly influenced by the amount of training they received.

2.2.5 Retention

Volunteer retention literature suggests that many facets within the organization have a bearing on whether individuals continue volunteering (Kessler, 1990).

But in general, volunteer retention is greatly influenced by four key factors (Bryen & Madden, 2006):

- **Motivational factors** for volunteers to retain in an organization can be separated into two major groups: altruistic and egoistic. Altruistic reasons are all about helping others and self sacrifice (Rubin & Thorelli, 1984). Egoistic motivations are more driven by self interest. Reasons like learning new skills or meeting new people are all egoistic (Mesch, Tschirhart, Perry, & Lee, 1998).

- Many **organizational factors** influence the retention of traditional volunteers. They care especially if their skills are used best (Saxon & Sawyer, 1983), if they are prepared for the volunteer tasks by special training (Gidron, 1985) and if they receive appreciation and support from the organization they enlist with (Stevens, 1991).

- **Demographic factors** like age, gender and level of education are in general less important than organizational ones but do influence the time, a volunteer stays in an organization (Bryen & Madden, 2006). Stevens (1991)

suggests that the time, the volunteer spends in the community that benefits from his voluntary work, is especially important for retention.

- Most relevant **psychological factors** are the individual expectations and attitudes towards the voluntary assignment and the amount of satisfaction the work is giving them (Bryen & Madden, 2006). Saxon and Sawyer (1983) are showing that volunteers can very quickly abandon their work when they become unhappy.

2.3   Research Question

We have found two research questions resulting from previous work in the field of episodic volunteering that are aimed to clarify, whether the phenomenon of episodic volunteering is present in open source. An additional goal is to find out, if the rediscovered occurrence of episodic volunteers is increasing in this field, like it is in other non-profit organizations and to find out in what way episodic volunteers are contributing.

The phenomenon is worth studying because it is attracting growing interest amongst non-profit organizations, especially Managers of Volunteers and has not been investigated so far (Macduff, 2005; Cnaan & Handy, 2005).

The resulting research questions are:

- To what extent are open source projects making use of episodic volunteering?

- In what way did the phenomenon of episodic volunteering evolve in recent years?

2.4   Research Approach

We have chosen an exploratory approach, to create a novel theory for episodic volunteering in open source and answer our research questions. We used a multiple-case study with two cases.

We interviewed volunteer managers from both cases (three interviews in total). The semi-structured interviews lasted between 30 and 45 minutes and were conducted via Skype or in person from September to November 2014. The interviews were recorded (audio only) and afterwards transcribed.

To incorporate both qualitative and quantitative data, we gathered additional public data (mailing lists, metrics, statistics) to supplement the interview data (Eisenhardt, 1989; Boychuk Duchscher & Morgan, 2004).

To analyze the gathered data, we used the grounded theory approach by Corbin and Strauss (1990), with a preliminary literature review and open coding of the gathered data.

MAXQDA was used to code the transcribed interviews and the public data. Starting with in-vivo coding (Mayring, 2004), open coding was used for analysis.

In the first work phase, important and interesting words or sections are coded with their meaning, or with the word itself as code (in-vivo). In a second phase, axial coding is done by grouping codes from the first phase in categories and finding relationships between those categories (Corbin & Strauss, 1990).

2.5   Used Data Sources

In the table 2.1, all major data sources are listed with a short comment on the source and the kind of data. We used public data to allow triangulation (Yin, 2014).

Name	Source	Notes
MarkMail	markmail.org Accessed: 15.10.2014	MarkMail is an online mailing list repository and has stored many KDE and Red Hat lists.
Bitergia	projects.bitergia.com Accessed: 22.10.2014	Bitergia is an online open source data repository and provides data on KDE and Red Hat.
KDE-Metrics	reports.kde.org /en/projects/kde-community Accessed: 18.10.2014	The KDE metrics program provides data from the project itself.
Fedora Wiki	fedoraproject.org/wiki/	The Fedora Wiki with many important information. Fedora is sponsored by Red Hat.
OpenHub	openhub.net	Formerly Ohloh.net is a public directory of open source projects.

Table 2.1: A table of used public data sources.

2.5.1   KDE

The KDE project (`www.kde.org`) develops an open source desktop that comes with a set of applications like KMail, Konqueror, Kontact and KOrganizer. KDE was founded in 1996 by Matthias Ettrich. The aim of the project is to make Linux useful to both expert and home office, with an easy to use desktop environment (Brucherseifer, 2004).

In 2006, the volunteer base consisted of around 1000 people, mainly living in Germany. Most of the males are between 20 and 30 years old and have some sort of computer science background (Lutterbeck, Bärwolff, & Gehring, 2006).

Bitergia (see table 2.1) provides current data for KDE. The data shows that ∼3800 code developers (∼300 core developers) are active and ∼8800 people participate in community discussions about the project.

2.5.2   Red Hat

Red Hat (`www.redhat.com`) is an open source software company located in North Carolina, USA. It was founded in 1993 and develops and sponsors many projects, including Fedora and Red Hat Enterprise Linux (RHEL); both are Linux based operating systems. The business model includes subscriptions for support services and the latest Red Hat software like RHEL (Lutterbeck et al., 2006). Fedora on the other hand is developed by an open source community supported by Red Hat. OpenHub (see table 2.1) currently lists ∼700 developers for Fedora.

Name	Case
Interview 1	The first interview with a KDE volunteer manager, responsible for translations.
Interview 2	The second interview with a KDE volunteer manager.
Interview 3	Interview with a volunteer manager from Red Hat.

Table 2.2: A table of conducted interviews.

2.6 Research Results

We found out, that episodic volunteers are present and welcome in all parts of open source development. They are present, but unevenly distributed within these organizations. What fields of work are often used by volunteers from that definition, are closely described in this section.

In the KDE project, all work is done by volunteers. Red Hat on the other hand provides a paid workforce to guide and support volunteer contributions in projects like Fedora (see KDE and Red Hat homepages).

No clear pattern of change in the number of episodic volunteers could be found in this research. Additional work must be done to clarify that point (see section future work 2.8.1).

2.6.1 Episodic volunteers are welcome

In both organizations, we found that episodic volunteers are noticed and are welcome by the volunteer management.

> *"They will show up and they will run some tests and they will tell us whether they passed or not and they will leave."* (Interview 3)

These kind of short term volunteers are welcome by both organizations, because they provide small but viable voluntary work:

> *"We want any single contribution that we can get, so we welcome [...] anyone."* (Interview 2)

> *"I think [episodic volunteering] is important [...] because it gets work done."* (Interview 1)

2.6.2 Reasons to volunteer episodically

What motivates volunteers to work episodically is described in this section. We also found some reasons, that make them stop volunteering.

Project work

Many volunteers use specific projects as a framework to gain experience. This motivates them to work for a short while. This behaviour fits well in the 'occasional' definition by Macduff (2005) because it has a fixed end and is recurring.

"We do some programs to get people in the community. The Google Summer of Code is the biggest one." (Interview 2)

Experience

The experience with open source work is also a significant factor for volunteers to work episodically. Young people, still in school or university education are doing their first volunteer work in an inconsistent manner. Very experienced contributors show this behavior, too.

"What I am talking about [...] are school people [...] and also very senior ones, [...] people who have experience, who are coming back. It's more about contribution experience, senior at the contribution level, not necessarily senior when you look at their age." (Interview 1)

Personal interest

Personal interest in projects or features volunteers want for their own use, are a strong motivator for episodic volunteers. They will contribute to these projects until the work is completed and stop contributing at that point. Prior work by Shah (2006) suggests, that code contributions can be driven by a need for a specific feature, of the volunteer himself.

"They had a feature that they felt was really important. So they would show up and they would do work to get that released [...] and then they would go away once that feature was on. They would no longer feel the need to show up and do anything." (Interview 3)

"Or they do a translation of specific application they want to use but isn't translated yet." (Interview 1)

Available time

The amount of spare time volunteers have is another key factor for volunteering in an inconsistent manner. One essential reason to have less time to volunteer is the kind of work the individual is doing. Often a new and demanding, or the first job they have, puts an end to the volunteering consistency.

"Some people just do not have the time. From time to time they find a moment to do something." (Interview 1)

> *"It is common, that you run into a lot of volunteers who will contribute like crazy during some portion of their university career but the minute they graduate and have to find a job you know they are out because, [...] [they] have to work 40 hours a week now."* (Interview 3)

The time factor is also often the reason to stop volunteering all together.

Bounce-back

Bounce-back – the returning of episodic volunteers – is mainly caused by the fulfillment of their needs. If they had a satisfying experience and their needs were met the last time they volunteered, they are likely to come back for more. Aside from those needs, we found that community can be a key factor to *"suck them in"* (Interview 2).

The responsibility they can gain during voluntary work is also an important factor. A flat hierarchy is helpful to achieve this effect very quickly and is therefore beneficial for episodic volunteering.

> *"They can be responsible for an important part of code within a week [...], they can quickly gain something from participating."* (Interview 2)

> *"There is no big hierarchy where you have to make a career in the community [...]."* (Interview 2)

But in the cases we investigated, nothing active (like personally asking them back) was being done to motivate episodic volunteers to bounce-back.

> *"We do not do that in part, because we do not have a system for that and in part, because it would probably annoy people."* (Interview 3)

2.6.3 Episodic volunteer's needs

We found out, that episodic volunteers have special personal needs or things they like or dislike strongly. The fields of work they are found in most often are directly influenced from these needs.

Fast onboarding and easy contribution

Our results show that episodic volunteers like fast onboarding processes without complex tooling or other things to learn. Also they like it, when they can

contribute easily without major knowledge or barriers of any kind.

> *"Activities which don't need as much ramp-up time or where you don't need a lot of time to learn or where you need less tooling and so on."* (Interview 2)

> *"Small modifications. At the application level, there are small modifications, small features, that are easily implemented."* (Interview 1)

Being successful

Feeling appreciated and doing something meaningful is essential in voluntary work. This is also true for short term volunteers in open source.

> *"To be able to contribute something meaningful and something that they can see that is meaningful."* (Interview 1)

> *"They will do something with their time that is easy and productive."* (Interview 3)

Negative factors

Episodic volunteers need the environment described above, to pick up voluntary work. That means, it will hinder contribution, if any of those factors are missing.

In addition, there are two important points: we found out, that long term assignments or constant work requirements (for example for more complex code that needs work every release cycle) are major problems for episodic volunteers. That is the reason why, in some areas of code development, not many of them are found.

2.6.4   Fields of work

The needs we just described result directly in the fields of work, episodic volunteers are most often found in. These fields are most clearly identifiable by easy onboarding and fast contribution:

Community work

Community work is a viable field of contribution for volunteers and is also used by episodic volunteers. This can be coordination, communication or marketing.

> *"We organize [...] maybe 20 different meetings a year and people go there for a weekend [...] and work there."* (Interview 2)

Bug reports

Bug reports are an important application for short voluntary work. In just a lunch break, a bug can be reported.

> *"Bug reports are something which is very suitable because it is very easy and a lot of people have an interest [in doing it]."* (Interview 2)

Translations

Translations are always needed and are in constant need of work. Native speakers can volunteer in this field almost without effort.

> *"For some translation topics [...] it does not take them much time, that is what they do."* (Interview 1)

Small tasks

Small tasks like testing an application, improving documentation (including changes in a wiki) and even small patches in code development can be done well in a short time.

> *"Small features, that are easily implemented."* (Interview 1)

> *"You can use a lot of episodic volunteers to maintain a wiki [...] and test stuff."* (Interview 3)

2.6.5 Organizational factors

Some organizational factors, concerning episodic volunteers in general, were found:

How to attract short term volunteers

It is in the interest of open source organizations to attract as many volunteers as possible – even though this is an investment of time and resources (Riehle, 2014).

To attract episodic volunteers, specific **projects** like 'Google Summer of Code' or the 'Fedora ambassador program', that are recurring once a year and discrete in time, are working well.

> *"They will be active once a year for a couple of weeks or months and then they will go away [...] until it is time to do that event again."* (Interview 3)

To provide **good documentation** is a second measure to attract episodic volunteers. This results directly from the needs a short term volunteer has. Easy onboarding is often provided by complete and comprehensive documentation. Wikis and FAQs will ensure that most of the tutoring needs of a new volunteer are met fast. This is part of best practices for open source companies and includes the documentation of project decisions (Riehle, 2014).

Managing volunteers

Episodic volunteers are hard to manage because they are many, each of them providing relatively little work. Each has to be guided in his onboarding process and assisted if problems arise. To provide that assistance a steady workforce, like regular volunteers, is needed.

> *"Thats where a good balance between people who are able to mentor and help these people [is needed]."* (Interview 2)

> *"Volunteers do not just magically appear and do useful work without someone making sure that things are out of their way, without making sure that they have all of the infrastructure that they need and someone to answer their questions and help mentor them along."* (Interview 3)

Code of conduct

There are very few requirements for episodic volunteers in general, but one important could be found. All volunteers need to learn a code of conduct and follow it to make frictionless cooperation possible. The KDE code of conduct can be found in the appendix B.

> *"There is just one condition, that they are willing to work with the community, that is the only requirement that is there for that person."* (Interview 1)

> *"It is not important to me at all to retain their work. I will very happily block somebody and ban them from the mailing list or just tell them, 'go pound sand. We don't need that regardless of the quality and quantity of your contributions', if they are harming the community."* (Interview 3)

2.6.6 General

No clear pattern of change

We could not find conclusive indications about the change of frequency volunteers work episodically. That frequency may stay at the same level, have increased or even decreased in the last years. More data is needed to provide a certain answer to that question.

We could find out, that all interviewed volunteer managers were aware of the phenomenon and did notice episodic volunteers contributing in their organizations. They are found in great numbers, meaning more than the core contributors of the project.

> *"I would say probably the same number [as the core community] of people contribute irregularly [...] and there are many many more people [...] who just submit a bug report."* (Interview 2)

Not easy to notice

This lack of conclusive data is because it is very hard to notice these volunteers and estimate their number. Reliable quantitative data is needed to measure the present amounts of episodic volunteers in open source. Especially in the code development, this can be achieved by analyzing commit rates and authors (see section future work 2.8.1).

The Pareto principle

We could find a workload distribution in the Pareto principle. This principle states, that roughly 80% of the effects come from 20% of the causes (definition by `http://en.wikipedia.org/wiki/Pareto_principle`). This is true for workload in open source projects, where in the less active 80% a lot of episodic volunteers can be found. Ma et al. (2013) show, that in that 80% majority, most code developers have a short activity span.

> *"There is kind of a [...] 80:20 rule where about 80% of the work in any project is done by that 20% of the people and vice-versa about 20% of the work is done by about 80% of the people."* (Interview 3)

The workload distribution mentioned before can also be found in commit reports of code development in the KDE metrics project (see table 2.1). There are other kinds of contributions discussed in this paper (like translations and bug reports) that do not show up in these metrics.

Prior work on commit sizes suggests, that commits in open source projects always show that kind of distribution (Hattori & Lanza, 2008; Kolassa et al., 2013).

2.7 Limitations

There are some limitations and concerns about the research that must be addressed to provide all necessary information to interpret our findings properly.

2.7.1 Elite bias

A possible effect of only interviewing community managers is elite bias, that can distort the resulting theory (Huberman & Miles, 1994; Myers & Newman, 2007). Our research method included the gathering of data outside the interviews, that can mitigate an possible elite bias. Nevertheless, the fact that only high ranking community managers with a lot of experience where being chosen for the interviews, does need to be mentioned.

2.7.2 Case selection bias

The selected cases are not chosen with polar types sampling (Eisenhardt & Graebner, 2007) but all from big companies. The aim of our theoretical sampling was to interview volunteer managers with as many volunteers as possible. This can result in a possible bias from the viewpoint of big organizations.

2.7.3 Low number of cases

Due to the fact, that the present work is a Bachelor thesis, no more than two cases of open source companies could be analyzed and a total of three interviews was the limiting scope of our research. The low number of cases is a possible limit of the generalizability of the resulting theory.

There is also a general limit to generalizability to exploratory research with case studies (Eisenhardt, 1989).

2.7.4 No direct interview of volunteers

The fact, that we did not interview volunteers directly, limits the accuracy on which we can assess motivational causes for episodic volunteers to contribute to

an open source project.

2.8   Conclusions

In this thesis, we investigated whether the increasing number of episodic volunteers present in non-profit organizations, is also visible in open source projects.

We did show that episodic volunteers are present and welcome in open source and shed light on the needs and fields of work of episodic volunteers and describe the resulting effects on open source projects.

Episodic volunteers need fast onboarding processes that makes contribution easy. They will work when they have time and dislike long assignments. Episodic volunteers are often new to open source or are senior in terms of experience. This type of volunteer contributes to the community, bug reporting, translations or other small tasks like small feature implementation. For open source organizations, managing episodic volunteers is time intensive; even more if no extensive onboarding documentation is provided.

Open source organizations need to be aware of the phenomenon and adjust their volunteer management strategy to accommodate episodic volunteers.

2.8.1   Future work

An immediate starting point for future work is an extending of the number of analyzed cases. This would mitigate the limitation of case number to the theory. To counter a possible case selection bias, smaller open source projects also should be chosen for additional cases.

A starting point of a confirmatory research paper would be to employ quantitative data from public data sources. This approach could also answer the question, in what way the number of episodic volunteers changed in total.

From these data sources, the set of people who committed at least one patch at a certain time could be compared some time later to the set of people who are still active.

From the data generated in this way, it could be confirmed that episodic volunteering takes place in code development of open source products. Similar approaches should be made to investigate other forms of contribution (like testing or translations).

A third approach would be to investigate how many episodic volunteers become regular volunteers. Such a research would need to track individual volunteers, accounting for a bounce-back to other organizations.

3 Elaboration of Research

3.1 Research Method

In this chapter we describe the application of the methodology we used and discuss issues and important points, we used special care in.

3.1.1 Case Selection

Case studies are used to investigate real world examples, to create novel theories. Both, qualitative and quantitative data, can be used to discover underlying relationships and phenomenons in these cases (Eisenhardt, 1989).

Finding good cases and interview partners is essential in exploratory case study research (Yin, 2014). We aimed for long term open source management from multiple organizations to broaden our view and get relevant data. This not random type of case selection is called theoretical sampling and employs the selection of cases based on their special fit to the research (Glaser & Strauss, 2009).

Based on these criteria we chose KDE and RedHat, both big companies with multiple products, a high number of volunteers and much experience in managing them.

3.1.2 Interview Design

We used a semi-structured interview method. Semi-structured interviews provide some mandatory questions, most relevant for the research. They also allow an individual interview script adaptation, best suited for the current subject (Myers & Newman, 2007). This way, we ensured that all important questions are asked, while also allowing additional optional questions, if the interview subject was able to provide further information.

We used silence as a tool to improve the tendency for elaborate answers (Rapley, 2001) and probe in depth for additional information with follow-up questions. We took special care to "break the ice" before the interview started with some smalltalk and after the recording ended, we asked for additional thoughts about the topic. This way, some subjects feel less pressured and provide additional information (Myers & Newman, 2007).

Bryen and Madden (2006) found, that it is difficult for volunteer managers, to identify volunteers who work episodically, therefore it is very important to provide a definition of episodic volunteers in each interview. This short definition we provided, helped the volunteer managers in question to give answers that fit with our definition of the phenomenon and to identify volunteers that fit this type of behaviour.

The provided definition is as follows:

> *Episodic volunteers are volunteers who prefer short term volunteering assignments or specific projects. Episodic volunteers may be one-off contributors or they can 'bounce-back' by returning for multiple assignments (Bryen & Madden, 2006).*

We did use the classification of episodic volunteers by Macduff (2005) (occasional/temporary/interim) to ask for different kinds of episodic volunteers, even though Bryen and Madden (2006) disagree with the classification from a practical viewpoint (they prefer the continuous scaly by Hustinx and Lammertyn (2003)). We decided to do so, because classes of volunteers can be easily asked about and measured by the interview subjects and the researchers.

3.2 The place of the Literature Review

We did some preliminary literature research before the analysis of the gathered data with a grounded theory approach took place. Here, we justify and explain the decision.

The first look at the literature did provide valuable guidance in the creation of our interview script (see the appendix A). The questions, topics and intentions behind each question are motivated in part by existing literature.

Glaser and Strauss (1967) originally both argued explicitly against an early review. Together with Corbin, Strauss changed his opinion (Dunne, 2011). Strauss and Corbin later supported a preliminary literature review because it supports theoretical sensitivity, provides a second source of data and stimulates questions (Strauss & Corbin, 1990).

Glaser (1992) strongly disagreed with this view and proposed several levels of literature required within grounded theory (McGhee, Marland, & Atkinson, 2007). In Glaser's words, the aim of grounded theory is to "generate a theory that accounts for a pattern of behavior which is relevant and significant for those involved" (Glaser, 1978, p.93). Glaser argues that it is problematic to read literature before the research is conducted. His view is, that all important interpretations from the research area will show themselves and no pointers from the literature are necessary (Hallberg, 2010). The general concern with early literature review is, that it could blind the researcher for relevant ideas and cause some data to be ignored because it does not fit the previous findings of related works (Hallberg, 2010).

The problem is not if a literature review should be done, but rather when it should be done (McGhee et al., 2007). Hallberg (2010) thinks, that it is necessary to conduct an early review to support planning of the research. This is in line with Glaser (1998), who suggests an early review supports justifying the launch the grounded theory study (May, 1986). In a second review of the literature results should be linked with previous work in the field (Hutchinson, 1993).

3.3   Used Data Sources

First term	Second term
One time	Contributor
Short time	Contribution
Short term	Volunteer
Ad-hoc	Participate
Episodic	Participation
One-off	Commitment
Micro	Committer
Casual	

Table 3.1: A table of search terms for data repositories.

Besides the interviews, public data was gathered to supplement them and increase the validity of our resulting theory by employing multiple data sources.

KDE uses its many mailing lists very intensely. These mailing lists are publicly searchable on MarkMail (see table 2.1). On MarkMail KDE mailing lists can be searched with the term "list:kde" to specify KDE mailing lists. Additional search terms can be used. We found a list of terms for searches in qualitative data repositories (see table 3.1). These terms are collected from related literature,

public data sources (see table 2.1) and from introspection. The terms are listed in decreasing likelihood to find relevant data for our research.

Qualitative data came from various sources like the KDEmetrics and Bitergia. Bitergia provides data on KDE and Red Hat including demographic data for retention statistics, code developers (categorized in core, regular and casual), and metrics on ticket and discusstion participants (acessable for KDE from `http://projects.bitergia.com/kde/browser/`).

The KDEmetrics program (see table 2.1) provides internally gathered data on the KDE project including commit statistics and metrics on author count (accessable from `http://reports.kde.org/en/projects/kde-community`).

Appendix A   Interview script

To talk about before the recording starts:
- 38 questions.
- It will be recorded.
- Please tell me all, you think is relevant.
- If you do not understand a question, please ask me.

Interview script
1. *Introduction.*
   1) List names of participants and project. Note the date.
      It is <date>. I am <interviewer> and I am speaking with <interview subject> of <project>.
   2) Thank interview subject.
      Thank you for participating in this research.
   3) Establish consent to record interview.
      This interview will be recorded and transcribed. Is this acceptable?
2. *Establish interview subject's authority.*
   1) Determine how long the interview subject has worked on the project.
      How long have you been involved in <project>?
   2) Determine in what capacity the interview subject has worked on the project.
      In what way do you contribute to <project>?
   3) Determine how the interview subject has interacted with volunteers.
      Does your work with <project> involve interacting with volunteers?
      (1) Probe further on how direct that contact is.
         In which ways do you work with volunteers?
         How does your work involve contact with volunteers?
   4) Get the interview subject's estimate on the number of volunteers. (To be later confirmed from external sources.)
      How many volunteers would you estimate <project> presently has?
3. *Understand how the interview subject perceives her or his role in terms of volunteering and volunteer retention.*
   1) Determine role with volunteers.
      As a <job description given by interview subject>, how do you support volunteers?
   2) Identify what constitutes "good volunteering"
      What sort of behavior do you want to promote in volunteers?
   3) See how the interview subject perceives retention, which is a typical goal of volunteer managers.
      How important is it to you to retain volunteers?
4. *Find out in which ways people are contributing episodically to open source projects.*
   1) Are one-off volunteers visible to the interview subject?
      Have you observed people giving only a short period of time such as a day or a few hours to <project>?
   2) Are interim volunteers present?
      Have you observed volunteers giving time on a regular basis but for less than six months?
   3) Are occasional volunteers being noticed?
      Have you observed volunteers providing service at regular intervals but for short periods of time?
   4) Is the interview subject aware of episodic volunteers bouncing back irregularly?

5. *Identify how common episodic volunteering is.*
    1) Define episodic volunteering and bounce-back.
       Episodic volunteers are volunteers who prefer short term volunteering assignments or specific projects. Episodic volunteers may be one-off contributors or they can 'bounce-back' by returning for multiple assignments.
    2) Identify frequency of episodic volunteering.
       Based on the definition you just heard, how common would you say episodic volunteering is in <project>?
    3) What activities are commonly done by episodic volunteers?
       Are there some activities where it is more common for people to volunteer episodically?
    4) Are social trend being noticed in episodic volunteers?
       Have you noticed any similar characteristics of episodic volunteers which distinguishes them from other volunteers?
       (1) In addition to personality characteristics, we are interested in demographic characteristics. If they only provide one, ask about the other.
           Have you observed any demographic/personality characteristics which distinguish episodic volunteers from other volunteers?
    5) Is episodic volunteering increasing in open source as in other types of volunteering?
       Have you observed a change in the number of episodic volunteers over time?
       (1) Dig for more details if necessary
           What changes have you observed?
           Over what time period?
           How large of a change?
           Is it still changing?
6. *Learn if this project is managing and making use of episodic volunteers.*
    1) How can episodic volunteers best contribute to the project?
       Are there activities that are particularly suited to episodic volunteering?
    2) How can episodic volunteers not contribute to the project?
       Are there activities that are particularly unsuited to episodic volunteering?
    3) Does episodic volunteering have value to the project?
       Is episodic volunteering useful to <project>?
    4) Does episodic volunteering provide good return on investment?
       How do you feel about investing your time in encouraging episodic volunteering?
    5) Is the project employing strategies to encourage bounce-back?
       What adjustments, if any, have you made to your volunteer strategy to accommodate episodic volunteering?
       (1) Get information about bounce-back, if it wasn't previously mentioned.
           Do you do anything to encourage episodic volunteers to bounce-back to <project>?
7. *Conclusion.*
    1) Indicate conclusion and invite subject to share additional insights.
       This concludes my questions. Do you have any additional thoughts you'd like to share?
    2) Thank the interview subject and invite her/him to view results.
       Once again, thank you very much for your time. I may be in touch in the next few months if I have some additional questions. I can also send you the research when it is completed if you would like.
    3) Stop recording and say goodbye.

Appendix B KDE code of conduct

KDE Community Code of Conduct

Preamble

In the KDE community, participants from all over the world come together to create Free Software for the desktop. This is made possible by the support, hard work and enthusiasm of thousands of people, including those who create and use KDE software.

This document offers some guidance to ensure KDE participants can cooperate effectively in a positive and inspiring atmosphere, and to explain how together we can strengthen and support each other.

This Code of Conduct is shared by all contributors and users who engage with the KDE team and its community services.

Overview

This Code of Conduct presents a summary of the shared values and "common sense" thinking in our community.

The basic social ingredients that hold our project together include:
•Be considerate
•Be respectful
•Be collaborative
•Be pragmatic
•Support others in the community
•Get support from others in the community

Our community is made up of several groups of individuals and organizations which can roughly be divided into two groups:
•Contributors, or those who add value to the project through improving KDE software and its services
•Users, or those who add value to the project through their support as consumers of KDE software

This Code of Conduct reflects the agreed standards of behavior for members of the KDE community, in any forum, mailing list, wiki, web site, IRC channel, public meeting or private correspondence within the context of the KDE team and its services. The community acts according to the standards written down in this Code of Conduct and will defend these standards for the benefit of the community. Leaders of any group, such as moderators of mailing lists, IRC channels, forums, etc., will exercise the right to suspend access to any person who persistently breaks our shared Code of Conduct.

Be considerate

Your actions and work will affect and be used by other people and you in turn will depend on the work and actions of others. Any decision you take will affect other community members, and we expect you to take those consequences into account when making decisions.

As a contributor, ensure that you give full credit for the work of others and bear in mind how your changes affect others. It is also expected that you try to follow the development schedule and guidelines.

As a user, remember that contributors work hard on their part of KDE and take great pride in it. If you are frustrated your problems are more likely to be resolved if you can give accurate and well-mannered information to all concerned.

Be respectful

In order for the KDE community to stay healthy its members must feel comfortable and accepted. Treating one another with respect is absolutely necessary for this. In a disagreement, in the first instance assume that people mean well.

We do not tolerate personal attacks, racism, sexism or any other form of discrimination. Disagreement is inevitable, from time to time, but respect for the views of others will go a long way to winning respect for your own view. Respecting other people, their work, their contributions and assuming well-meaning motivation will make community members feel comfortable and safe and will result in motivation and productivity.

We expect members of our community to be respectful when dealing with other contributors, users and communities. Remember that KDE is an international project and that you may be unaware of important aspects of other cultures.

Be collaborative

The Free Software Movement depends on collaboration: it helps limit duplication of effort while improving the quality of the software produced. In order to avoid misunderstanding, try to be clear and concise when requesting help or giving it. Remember it is easy to misunderstand emails (especially when they are not written in your mother tongue). Ask for clarifications if unsure how something is meant; remember the first rule — assume in the first instance that people mean well.

As a contributor, you should aim to collaborate with other community members, as well as with other communities that are interested in or depend on the work you do. Your work should be transparent and be fed back into the community when available, not just when KDE releases. If you wish to work on something new in existing projects, keep those projects informed of your ideas and progress.

It may not always be possible to reach consensus on the implementation of an idea, so don't feel obliged to achieve this before you begin. However, always ensure that you keep the outside world informed of your work, and publish it in a way that allows outsiders to test, discuss and contribute to your efforts.

Contributors on every project come and go. When you leave or disengage from the project, in whole or in part, you should do so with pride about what you have achieved and by acting responsibly towards others who come after you to continue the project.

As a user, your feedback is important, as is its form. Poorly thought out comments can cause pain and the demotivation of other community members, but considerate discussion of problems can bring positive results. An encouraging word works wonders.

Be pragmatic

KDE is a pragmatic community. We value tangible results over having the last word in a discussion. We defend our core values like freedom and respectful collaboration, but we don't let arguments about minor issues get in the way of achieving more important results. We are open to suggestions and welcome solutions regardless of their origin. When in doubt support a solution which helps getting things done over one which has theoretical merits, but isn't being worked on. Use the tools and methods which help getting the job done. Let decisions be taken by those who do the work.

Support others in the community

Our community is made strong by mutual respect, collaboration and pragmatic, responsible behavior. Sometimes there are situations where this has to be defended and other community members need help.

If you witness others being attacked, think first about how you can offer them personal support. If you feel that the situation is beyond your ability to help individually, go privately to the victim and ask if some form of official intervention is needed. Similarly you should support anyone who appears to be in danger of burning out, either through work-related stress or personal problems.

When problems do arise, consider respectfully reminding those involved of our shared Code of Conduct as a first action. Leaders are defined by their actions, and can help set a good example by working to resolve issues in the spirit of this Code of Conduct before they escalate.

Get support from others in the community

Disagreements, both political and technical, happen all the time. Our community is no exception to the rule. The goal is not to avoid disagreements or differing views but to resolve them constructively. You should turn to the community to seek advice and to resolve disagreements and where possible consult the team most directly involved.

Think deeply before turning a disagreement into a public dispute. If necessary request mediation, trying to resolve differences in a less highly-emotional medium. If you do feel that you or your work is being attacked, take your time to breathe through before writing heated replies. Consider a 24-hour moratorium if emotional language is being used — a cooling off period is sometimes all that is needed. If you really want to go a different way, then we encourage you to publish your ideas and your work, so that it can be tried and tested.

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