1-1-2005

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Global Discourse and Local Practice: A Study of the Role of Open Source Software in SchoolNet Namibia

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ABSTRACT
This paper reports from a research study of SchoolNet, an initiative for spreading computer literacy and Open Source Software (OSS) in Namibia, West Africa. The organization uses refurbished hardware together with OSS to bring computers and Internet to Namibian schools. The purpose of the paper is to critically examine the arguments about the potential success for OSS in developing countries put forward in western OSS developmental discourse, which is part of a larger ICT developmental discourse, by comparing it to actual experiences from the work of SchoolNet from the Namibian perspective. In the paper these arguments are related to the Namibian local context. The results show that advantages associated with OSS is only partly applicable in the Namibian school context due to, among other things, differences in economic circumstances, knowledge infrastructures and the local software market.

Keywords
Opens source software, developing countries, developmental discourse analysis.

INTRODUCTION
Open Source Software (OSS) has formed a successful alternative to proprietary software in western societies. During the last decade OSS development has had an enormous impact on areas such as software development and software business models (e.g. Feller and Fitzgerald, 2002; Wayner, 2000). This is a result of – among other things – the open source movement's maturity, quantitative as well as qualitative growth and recognition in media. In later years it has also become recognized as important for the public sector in several countries in the western world and as an important alternative, particularly interesting for developing countries. Nations such as China and different African countries are mentioned as good candidates for taking advantage of OSS.

OSS is today recognized as rapidly developed, stable and secure software of high quality. Besides these technical advantages, many open source advocates argue that OSS also is a competitive alternative to proprietary software in order to bridge the digital divide. Developing countries, it is argued, have a lot to gain from choosing open source alternatives. Open source is often free of cost and possible to adapt to local needs such as special functionality, local language etc, which should make it interesting for developing countries. The advantage is said to be twofold: on the one hand as a strategy to increase the level of ICT literacy in a local context characterized by lack of financial resources, and on the other hand as a way to create an alternative way for national ICT development that will avoid problems associated with proprietary software, such as high licensing costs, lock-in effects and global software companies’ lack of interest for adjustments to local conditions and demands unless there is good chance for a successful future for that software.

Arguments such as the ones presented above, are often put forward by proponents for OSS and are today an integral part of OSS discourse worldwide. But to what extent are these claims and assumptions about the needs of and opportunities for developing countries relevant for these countries seen from a local context? Discourses form systems of arguments that constitute worlds of their own. In the open source discourse there are many arguments for showing OSS superiority compared to proprietary software but also for being a better “value for money” alternative. Yet we have little understanding of the actual
implementation, use and growth of OSS in developing countries with reference to local conditions, agendas and infrastructures.

This paper reports from an ethnographic study of SchoolNet, an initiative for spreading computer literacy and OSS in Namibia, West Africa. The organization uses refurbished hardware together with OSS to bring computers and Internet to Namibian schools. The purpose of the paper is to critically examine arguments about the role of OSS in developing countries put forward in western OSS developmental discourse by comparing them to actual experiences from SchoolNet Namibia.

METHODOLOGICAL CONSIDERATIONS

Today there is a tendency to describe open source in developing countries mediated through a filter based on western attitudes and beliefs rather than taking departure in local contexts. In this paper we therefore want to give an overview of the developmental discourse in order to be able to critically examine it. We do this by comparing it to local practices studied in an ethnographic field study of SchoolNet, an organization aiming at implementing OSS in Namibian schools.

A six-month study was conducted of which one month was fieldwork on location in Windhoek, the capital of Namibia. The on location study was an ethnographic field study conducted by two of the authors. The fieldwork took place at SchoolNet Namibia's headquarter in Windhoek, at local schools and at an OSS conference. 18 more formal in-depth interviews where conducted and later transcribed. However, much important data where gathered through informal interaction with people related to SchoolNet. When the authors first met up with SchoolNet’s volunteers they where immediately drawn into the daily activities, working side by side with the local volunteers to load computers that were to be transported and set up in a village outside Windhoek. This developed to natural contacts with the volunteers, which also showed valuable for future contacts and in-depth interviews.

Interviews and observations were conducted with volunteers as well as the project director and representatives for the local university. The style of fieldwork can be termed participant observation ethnographic fieldwork (Hammersley and Atkinson, 1995; Myers, 1999; Orlikowski 1991). Many informal meetings and discussions took place in situ, for example meetings with people extensively connected to SchoolNet’s activities in and around Windhoek. These informal meetings were valuable for the overall understanding of the role of OSS and the work of SchoolNet Namibia. Even if the fieldwork did not take place for an “extended period of time”, which is often seen as a characteristic for a fieldwork to be considered an ethnographic fieldwork (Myers 1999, Yin 2003), we still think that it was conducted with an ethnographic approach since the authors immersed themselves in the life of the social group and activities studied, which provided for many occasions for collecting detailed, observational evidence.

OPEN SOURCE AND THE DEVELOPMENTAL DISCOURSE

Much research on OSS has been carried out in order to understand it as an alternative way to develop and distribute software and how this is achieved (Edwards, 2001; Feller and Fitzgerald, 2002; Raymond, 2001; von Hippel, 2001). This has been done within a wide range of areas like software processes (Feller and Fitzgerald, 2000), innovation models (von Hippel and von Krogh, 2003) and studies of motivation (Bonaccorsi and Rossi, 2003). Much of the research has drawn on organization studies, theories on knowledge management and more general information systems topics (Bergquist and Ljungberg, 2001; Ljungberg 2000), commonly focusing on how to make OS/FS communities more effective or profitable e.g. investigating how knowledge generating and sharing processes, innovation and systems development within open source communities can be managed and refined or translated for other types of organizations (Lerner and Tirole, 2000; for an overview see Adam, Feller and Fitzgerald, 2003).

Even if we can identify a strong developmental discourse, little research about OSS in developing countries has been done so far (an exception is Kogut and Metiu, 2001). There is a need for more knowledge about the specifics of OSS in developing countries.

Braa, Monteiro and Sahay (2004) argue that several issues about information systems in developing countries are common across most applications and areas (see also Agerou and Walsham, 2000). But even if there are similarities, the differences must be recognized and taken into account (Walsham and Sahay, 1999). Especially important is to critically investigate discourses about OSS and developing countries in order to demystify and make it possible to manage such discourses in order to create successful open source projects in developing countries. In this section an account of this discourse will be made and, in the result section, related to the study of SchoolNet Namibia.
Table 1. The developmental discourse on “success factors” for OSS in developing countries.

<table>
<thead>
<tr>
<th>Argument</th>
<th>Consequence for developing countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free of cost</td>
<td>Affordable for developing countries that lack financial possibilities to invest in proprietary software.</td>
</tr>
<tr>
<td>Creates an infrastructure for learning and innovation</td>
<td>Source code is available and possible to study, learn from (increased ICT literacy) and develop new systems and applications from, which can be spread to other users without cost.</td>
</tr>
<tr>
<td>Avoid lock-in effects</td>
<td>Developing countries often lack existing ICT infrastructures of proprietary systems, which make them suitable for directly taking the leap to OSS and thereby avoiding lock-in effects that are often the case in western societies.</td>
</tr>
<tr>
<td>Local adaptation</td>
<td>Because developing countries seldom are big customers of of-the-shelf-products, there is little interest from large proprietary software developers to make local adaptations. OSS makes this possible for local entrepreneurs or voluntary workers.</td>
</tr>
<tr>
<td>Stability and security</td>
<td>Stable systems are important for all user situations. However, developing countries have even greater need for stable and secure systems.</td>
</tr>
<tr>
<td>Local markets</td>
<td>Create local markets for software development, support etc.</td>
</tr>
</tbody>
</table>

As argued by Thompson (2004), critical discourse analysis has showed how ICT has become heavily involved in the discursive formation of so-called “less-developed countries” (see also Cogburn, 2003). The theoretical concept “developmental discourse” is important (Thompson, 2004). It follows Foucault’s (1982) notion of discourse as a system of rules that constitutes reality in a society during a certain time. A discourse constitutes the relationship between knowledge and power. Developmental discourse analysis has thus been used to question the legitimacy of certain ways of describing development. Critics of development have instead emphasized the significance of situated and local knowledge as opposed to the representational discursive knowledge of professionals. It is argued that it often is the latter that acts as the legitimizing discourse, which comes to shape developmental interventions (Thompson, 2004: 2).

The OSS developmental discourse differs from the more general ICT developmental discourse in a number of ways that actually is important for constituting OSS as an area and agenda in itself and as opposed to ICT in general, which often is described as a proprietary and commercial activity (Szczepanska, Bergquist and Ljungberg, 2005). OSS becomes a part of the developmental discourse as a better choice than proprietary software for developing countries based on a set of arguments that link OSS to social development. Examples of texts that express the OSS developmental discourse are found at The East African Centre for Open Source Software\(^1\), The National Advisory Council on Innovation\(^2\) and Free and Open Source Software Foundation for Africa\(^3\), but examples could be found in many places and contexts (see also Reijswoud and Topi, 2003). Table 1. summarizes some of the more central arguments for OSS and its consequences for developing countries as it appears in the OSS developmental discourse.

The developmental discourse raises questions, problems and possibilities for ICT in developing countries. It also creates relationships and states circumstances as “natural” or “true”, and thereby generalizes complexities, dynamics and the uniqueness of the locale. For instance, the developmental discourse understands some countries as being in a process of “development”, without taking into account differences between countries, or regions within countries. Simply by being a

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1. \(\text{http://www.eacoss.org}\)
2. \(\text{http://www.naci.org.za/floss}\)
3. \(\text{http://www.fossfa.net}\)
part of a continent, a country can be characterized as “developing” and thus in certain ways be seen as similar to all other countries on that continent, or other countries in the world that are defined as “developing countries”. When such structures of normalized ones have been set, discourses connect to other discourses. Here the discourse on ICT and development becomes connected to OSS and an amalgamation occurs where the developmental theme works coherent with the existing OSS discursive logic, as presented in Table 1. To give some examples of how systems of coherence works: OSS is “free of cost”, which has one connotation in a western perspective in relation to the commercialization of software as well as the open source movement’s idea that information should be free and open. This makes OSS “ideal” for developing countries because they “have no money”. Another set of arguments is connected to the idea of developing countries lacking technical infrastructures. It is constructed as an advantage because they can take the leap to OSS without having to consider existing systems. This way they have a chance to avoid lock-in effects that in the OSS discourse is seen as one reason why western organizations and companies do not involve in OSS-initiatives.

These examples show the principles in the OSS developmental discourse. In the next section a background description of the OSS project SchoolNet Namibia is presented followed by results from the field study. Here the empirical findings from the ethnographic study in Namibia about local practices and experiences will be discussed in relation to the OSS developmental discourse presented in Table 1.

THE SETTING: NAMIBIA, ICT AND SCHOOLNET

Namibia is a vast and sparsely populated (about 1.8 million people) country in West Africa. The economy is market-driven and the government encourages private businesses and foreign investors. It is one of the richest countries in the southern parts of Africa, but the gap between the poor and the rich population is still large. Since Namibia gained independence in 1990 many efforts have been made to improve the situation for the poor part of the population concerning schools, infrastructure, water, health care and public utilities.

The ICT infrastructure in Namibia is not well established. However, since the early 1990’s, there has been an explosive growth within the ICT field, concerning the use of telephones. There are many different Internet Service Providers (ISPs) in Namibia who increase the number of telephone lines and thereby the potential for Internet use. Internet cafés are becoming common, especially in the capital Windhoek. Still, large parts of the rural population have no access to Internet or have not even heard about it. Internet is normally slow and high cost is an inhibitor to the spread of Internet usage (Hesselmark, 2002).

SchoolNet Namibia (SNN) (www.schoolnet.na) was constituted as a voluntary non-governmental organization (NGO) in 2000 with the purpose to support Namibian educational development sector with sustainable Internet access. SchoolNet use refurbished computers with open source software. They provide installation, back up, support, education and helpdesk services at schools. This is coupled with different incentive mechanisms for users (such as the “Futures Programme”). The idea is that children, teachers and schools will be provided with means to take a responsibility role for sustainable ownership of Internet technologies.

SNN has a few employees and about 20 volunteers and is today depending on donor partners. SchoolNet’s Kids on the Block program for future volunteers, which is a computer literacy training program, consists of a ten-week course in the basics of computer use. It covers computer theory, hardware and vocabulary, and the basics of using a PC, such as office suite applications, email and web browsing. Trainees who perform satisfactorily can be given the chance to work as a resident trainer in a school serviced by SchoolNet Namibia. The 16-23 year old volunteers, who are primarily students at schools, organize the education as peer-to-peer training. By doing this, SchoolNet increases the overall ICT skill level in the country as well as getting help with their work in schools (Ballantyne, 2003). An example of an attempt to make youth active was SchoolNet’s globally rewarded website project “The Impact of HIV/AIDS on Katutura”. The project was launched in 2002 as an attempt to inform and spread awareness of HIV/AIDS. The information was based on knowledge and experiences from local people in the poor community Katutura, situated in Windhoek, and the website was dedicated to Namibia’s youth.

RESULT: GLOBAL DISCOURSE AND LOCAL PRACTICE

In this section different arguments in the OSS developmental discourse will be discussed in relation to results from the local field study in order to be able to discuss the relationship between global discourse and local practices. A few significant themes have been chosen to highlight the complexities of different problems and opportunities for OSS in the Namibian context.
Free of cost

The developmental discourse suggests that OSS is an opportunity for developing countries because they lack financial possibilities to invest in proprietary alternatives. Another important argument is to see OSS as a statement against proprietary software. Therefore OSS is a possibility to get quality software for free.

The study shows that SchoolNet saw this as a valid reason to choose OSS. Open source was seen a good choice for many reasons and one of them was that it is free. However, contrary to the OSS developmental discourse any software that reduces costs was seen as favorable. The main reason was not that it was OSS. Whatever software could be required at a low cost was seen as preferable. If a proprietary vendor would suggest a good bargain for software, this would be seen as interesting as an open alternative. In the western OSS discourse OSS is often defined in opposition to proprietary software and the choice of OSS is often argued based on ideological statements, such as the urge for openness, access to source code and the superiority of peer-produced software. For SchoolNet OSS was a way to cut costs, as expressed by a SchoolNet management representative:

“Microsoft versus OSS, for me are non-issues. We are doing this purely on a cost of support basis.” ... “The point is that we can’t say one or the other [OSS vs. proprietary software] and stick with it.” ... “A lot of people see SchoolNet as an anti-Microsoft brigade, and we’re not. We’re just challenging them to meet our standards, that’s all.”

(SchoolNet management representative)

Open source is not primarily seen as repudiation from proprietary software, but a possibility to create a leap towards an ICT mature school. SchoolNet had a clear vision and a goal for their project. Available programs, systems and vendors where judged and challenged based on this vision. Reducing costs was one important factor. Another important factor was to create sustainability for a further development of ICT in schools. This meant that SchoolNet would not choose solutions on a short-term basis without considering the long-term effects. Here OSS was strategically superior to cheaper but riskier projects involving proprietary software vendors who offered to give away hardware and software but demanding costly investments in the future.

OSS and knowledge infrastructures

Cost was seen as a smaller problem compared to the lack of knowledge. The number of highly skilled programmers in Africa is quite low (except for South Africa). In order to take advantage of OSS a knowledge infrastructure has to be established. Hanseth (2003) has discussed the importance of understanding knowledge as an infrastructure. Knowledge infrastructures are characterized by their relationships, interdependences and kinds of standards. Different procedures and practices require compatible and standardized interfaces between the practices and the pieces of knowledge upon which they are founded. Often the introduction of ICT means adding to an already installed base or infrastructure of applications and systems (Hanseth and Monteiro, 1997).

This has important consequences for the impact of OSS in the context of the studied project. The OSS discourse in the west often highlights openness as one of the most important features of OSS. With access to the source code users have the possibility to study, tweak, develop and localize the systems. However, this becomes possible because of an existing knowledge infrastructure consisting of programmers (who often are a result of an advanced education system) who not only have access to computers and the Internet, but also share practices and pieces of knowledge to make them work as an “epistemic culture” (Hanseth, 2003 with reference to Knorr-Cetina, 1999, see also Edwards, 2001). One could argue against this that OSS is a highly Internet based activity and most open source projects are developed in online communities. However, the study shows that, even if hackers in Namibia have access to Internet and OSS systems and applications, the epistemic culture must be of a more local character to work as a knowledge infrastructure with local impact.

Some empirical data from the study shows the consequences of this situation. Namibia has 1,585 schools, 700,000 learners and 18,000 teachers but only 103 computer teachers. Most of them work in private schools. This, in combination with the fact that there is only one computer for every 280 student clearly indicates the lack of knowledge infrastructure in the ICT field. To be able to participate in the OSS epistemic culture Namibia would need more teachers with ICT knowledge, better knowledge in English and mathematics as well as more and better computers in schools.

An interviewed representative for higher education also meant that the focus for higher education was programming, but what was needed was more knowledge about systems administration and how to handle a computer. The person was very positive to SchoolNet and their work and believed they could make a difference for the educational level of Namibia, but the immediate need for knowledge infrastructure was systems administration before programming.
Lack of resources for local adaptation

Another consequence of the lack of knowledge infrastructure was the lack of local adaptations. At the time of the study about 200 out of the 1,585 Namibian schools were connected to SchoolNet. SchoolNet bought refurbished computers from the non-profit organization netDay. They used a thin-client solution with the Linux distribution OpenLab3, which they bought from a South African company named DireqLearn. DireqLearn develops free software under the GNU Public License (GPL) but also add proprietary educational software named LearnThings as a default software package that comes with the operating system. LearnThings is an educational support program produced in the UK. At the time of the study no adaptation had been made to make it suitable for Namibian schools, which was seen as a problem by SchoolNet management.

Even if OSS was preferred, commercially available alternatives sometimes had to be chosen because they were “better than nothing” and at least supplied some software with content for the schools. The lack of developers that could create locally adapted content (in terms of local language, geography, history and culture) forced the managers to buy standard packages just to have some software running on the computers for teachers and learners to work with. Even though OSS provided possibilities for local adaptation, it was in reality not an option.

OSS for creating local business cases

Many companies in Namibia use OSS for their backend solutions, but most of the software and support is bought from South Africa. An interviewed representative for higher education thought the use of OSS will grow stronger in Namibia in the future, but that Namibia probably will not be a country contributing to the pool of open source software in the near future. The reason for this was because:

“...what you need for developing OSS is truly a job where you don’t have much to do. And you need the knowledge. The industry is not that far here that they will employ somebody for developing OSS, like as is somewhat possible in Europe. Even in Europe it’s not easy to find a paid position where you’re allowed to do that. You have to do it all in your spare time.” (Higher education representative)

Here the attitude is that OSS development is a leisure activity, or at least an activity that requires abundance of time and resources. Business activities must be focused to certain niches, or as the interviewed person quoted above expressed it: “They can afford employing people for doing something general, something for the use of all. They don’t see the value and many of them have very tight budgets so they just don’t have the means to do it.”

Lock-in effects

A central theme in the OSS discourse is openness as almost a necessity for avoiding lock-in effects. Lock-ins typically occurs when ICT companies create standards or solutions of their own as a way to force users to continue with their products and services. Open standards are not an open source issue per se. However, in practice open standards are often associated with OSS and have become an active ingredient in OSS discourse.

However, for some actors in Namibia, such as members of the municipality and some companies, lock-ins was not seen as being pushed by proprietary companies. Instead it was seen as “becoming a part of the west”. Becoming part of a proprietary system was understood as getting connected to western systems, technologies, business and thinking. This was not the case in SchoolNet, but because the organization works together with different other organizational actors who could see the benefits with OSS but who still would choose proprietary standards to become part of the “outside” world, SchoolNet had to relate to such discussions. This also made it difficult for SchoolNet to get political and financial support for their activities.

CONCLUSION

The aim of this paper has been to show how arguments put forward in OSS developmental discourse, concerning advantages to be made for developing countries if they embrace OSS, is partly a notion based on western experiences and circumstances. This is not the same as rejecting the possibilities for OSS in developing countries. Instead it highlights the need for alternative research tracks in order to assess a more accurate view of the matter. Generally SchoolNet’s work is a great success. However, many of the problems encountered when adapting OSS to the Namibian school-context – such as the lack of developer networks and the lack of an ICT knowledge infrastructure – show that some of the benefits implied in the use of OSS are dependent on local context and resources. This is in itself not a very surprising result, but because such resources often are taken for granted in western societies their importance tend to become invisible. Factors usually associated with
successful ICT projects, in developing countries as well as elsewhere, have to be understood and analyzed in relation to the differences between national and/or cultural contexts and can become viewable when looked at from the perspective given by ethnographic studies of actual practice analyzed through adequate theoretical lenses. Such analyses increase the awareness of an eventual bias caused by the developmental discourse.

ACKNOWLEDGMENT

The authors wish to thank the staff and volunteers at SchoolNet Namibia.

REFERENCES


