

OPEN SOURCE SOFTWARE TO SUPPORT THE EDUCATION PROCESSES IN SOFTWARE DEVELOPMENT IN POST-SOVIET COUNTRIES

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Abstract

This report considers the advantages, problems and the inevitability of involvement of students studying computer sciences in open source software development projects. The current situation, trends, as well as the case of post-Soviet countries on the example of Azerbaijan are considered.

Аннотация

Данный доклад включает рассмотрение преимуществ, проблем и необходимости вовлечения студентов, изучающих компьютерные науки в проекты разработки программного обеспечения с открытым исходным кодом. Рассматриваются существующая ситуация, тенденции, а также случай пост-советских стран на примере Азербайджана.

Introduction

Long-term sustainability can be considered as a major indicator of quality and health of software systems. Many organisations have requirements for long-term sustainable software systems and associated digital assets. Open Source Software (OSS) has been identified as a strategy for implementing long-term sustainable software systems [1]. For any OSS project, the sustainability of its communities is fundamental to its long-term success [2].

Taking into account that the OSS communities can consist of developers, users, and many other specialists, education of specialists in subjects of OSS support as well as its communities is essential. Teaching students how to participate in OSS projects provides them with meaningful and highly marketable hands-on experience, and potentially helps ensure OSS communities to have a sufficient number of qualified developers to meet their needs [3].

In many cases OSS in education process is considered just as a free tool to use [4][5][6]. Generally, it is a reasonable approach. But in case of teaching subjects relating to software development, OSS should be used not only as tools or libraries, but also as examples of how to implement real projects. Indispensability of OSS implementation in education processes, troubles and approaches of the implementation are in the consideration here on base of teaching experience within post-Soviet countries.

Situation with OSS and education

Experience of teaching programming and study situation in post-Soviet countries show that overwhelming majority of students do not understand well the value of OSS. The only feature of OSS they mentioned in discussions is just free acquisition and use. The root of such limited evaluation of OSS lays in remains of Soviet culture where no institute for intellectual property existed. This fact leads to a cursory consideration of software licenses including its components [5], resulted in absence of knowledge and methodology established by teachers as well as of software development companies.

While software development has been steadily growing in developed countries, the isolation of USSR resulted in the fall behind in software development and education in software related subjects. Although there are single cases of a breakthrough, we cannot speak of a satisfactory situation in these sectors on the whole. Many undeveloped countries (such as Zanzibar) have the similar issues [6].

Prerequisites for development of OSS in education

Software development is one of the cheapest start-ups because everything it requires is a computer, some working space, and power. OSS makes it cheaper because it reduces/eliminates cost for operating system, development tools, and utilities. The two main problems observed in the post-Soviet countries (as well as in Zanzibar) are academic staff resistance to change and little understanding of OSS by educational institutions [6].

This fact means that training the trainers/teachers and motivating them to implement OSS in education in higher extent is a starting condition to train specialists who can be a part of OSS community. In order to initiate and support this process the following facts should be taken into consideration:

- Current OSS growth;
- Motivation of Individuals and Organizations;
- Influence to Economy and Education.

Current OSS growth:

- Corporations and companies contribute to OSS projects;
- Organized programmers' teams are involved in the projects;
- Modern methodologies are used in project management;
- Closed Source Software is turning to Open Source Software (Microsoft, IBM, Oracle, etc.).

Motivation of Individuals:

- Personal enthusiasm, fun;
- Willingness to create something useful and significant for people;
- Improvement of skills, career (becoming a community leader, employment, ...).

Motivation of Organizations:

- Open Source software allows small enterprises to afford innovation;
- Independence on the price and licensing policies of large software companies;
- Good IT specialists are easy to be found in Open Source;
- Opening source code allows gaining the sound reputation among customers and competitors;
- Recognize the values of the Open Source movement;
- Companies want to place source code and skills at the disposal of the Open Source Community and hope that other companies will do the same;
- Companies think that software should not be a proprietary commodity;
- Useful to fix bugs and improve the software;
- Reliability and quality of the Open Source software;
- Allows studying the code written by other programmers and using it for developing new programs and products;
- Allows obtaining products unavailable on the proprietary software market.

Influence to Economy and Education:

- Participation in OSS of universities and companies;
- International participation;
- Participation of trainees add temporary unemployed individuals;
- Use of gained international experience of OSS project management:
 - Bringing more labor force;
 - Lower development cost;
 - Bringing proven business models and technical tools.

Involvement in OSS projects

To become a valuable member of OSS community an individual should be involved in corresponding OSS project in as much extent as possible. Education of students in the way they are practically involved in OSS project can be based on different level of the involvement. This approach is convenient for evaluation of individual's progress and different involvement for different specialties. SSTypesLT Project [7] as an example with seven levels of involvement in OSS was elaborated, including the following stages:

1. Downloading, installation and use of the software. Reporting feedback;
2. Development of documentation, translation;
3. Study of code and documentation;
4. Correction of code;
5. Development of new code;
6. Creating the original project;
7. Introduction and popularizing of the original project.

Results

Involvement of teachers and students in OSS projects is very important and creates ground for sustainable OSS communities as well as improves their skills. This involvement can be in different extent that makes implementation of OSS in education processes smooth and manageable.

Involvement in OSS projects as a part of countries' integration into the world economy is important for developing ones. The detailed analysis should be made to determine the impact of OSS in education [6]. Motivation of individuals and organizations should be considered as the main movers in OSS adoption process.

Acknowledgments

Some information regarding this research was provided by Software Systems Research Group, School of Informatics, University of Skövde.

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