



Open source software: The effects of training on acceptance



M. Dolores Gallego^{a,1}, Salvador Bueno^{a,*}, F. José Racero^{a,1}, Jan Noyes^{b,2}

^a University Pablo de Olavide, Ctra. Utrera, km 1, 41013 Sevilla, Spain

^b University of Bristol, Office 1D24, 12a Priory Road, Clifton, Bristol BS8 1TU, United Kingdom

ARTICLE INFO

Article history:

Available online 28 March 2015

Keywords:

Open source software
Training
Technology acceptance model

ABSTRACT

Open Source Software (OSS) is an alternative to proprietary software. It is growing in popularity, which has brought about an increase in research interest. Most of the research studies have focused on identifying individual personal motives for participating in the development of an OSS project, analyzing specific solutions, or the OSS movement, itself. No studies have been found which have undertaken research on the impact of user experience and training on OSS. The study reported here sought to identify factors that predict acceptance of technologies based on OSS after training in these solutions. A research model based on the Technology Acceptance Model (Davis, 1989) was developed. Furthermore, the possible moderating effects of users' gender, age and level of education were analyzed. It was found that external determinants such as user training, user fit, technological complexity and trainers' support were important indicators in the success of adopting these solutions.

© 2015 Elsevier Ltd. All rights reserved.

1. Introduction

Open Source Software (OSS) is a phenomenon of increasing significance (Lundell, Lings, & Lindqvist, 2010). In recent years, it has become a movement popular with end-users, companies and public administrations attracted by the possibility of controlling the design of the software (Höst & Oručević-Alagić, 2011, Rolandsson, Bergquist, & Ljungberg, 2011). So, OSS allows freedom to have access to the system software regardless of associated price or cost. This has brought about an increased interest from the industry on how to use open source components, to participate in the open source community, to build business models around this type of software development, and to learn more about open source development methodologies (Höst & Oručević-Alagić, 2011).

This freedom to access to OSS is divided into four essential parts (GNU, 2013): (1) the freedom to run the program, for any purpose; (2) the freedom to study how the program works, and change how it does your computing as you wish; (3) the freedom to redistribute copies so you can help your neighbor; (4) the freedom to distribute copies of your modified versions to others. Indeed, all OSS licenses are essentially the same with respect to these four freedoms;

however, it is worth noting that OSS licenses differentiate in the degree of restrictions imposed on the ability of the user to redistribute modified versions based on a concrete OSS (Sen, Subramaniam, & Nelson, 2011).

In the main, the concern of prior research on OSS is twofold, and in both, the education and training of individuals have a relevant role on the development of these solutions. On the one hand, numerous studies have studied the motivations of his adoption. In this sense, Feller and Fitzgerald (2002) divided the motivational factors into three groups: technological, economic, and socio-political. Similarly, Qu, Yang, and Wang (2011) identified three groups of motivations in an enterprise environment: organizational, technological, and environmental. One year later, Lakka, Michalakelis, Varoutas, and Martakos (2012) analyzed the determinants of the OSS market potential through the case of the Apache web server. Their findings suggest that the diffusion of Apache depends on factors both endogenous and exogenous to a particular country, namely technological infrastructure, level of skills and education, and Information and Telecommunication Technologies trade.

Other studies have analyzed how organizations adopt these solutions. Hauge, Ayala, and Conradi (2010) identified six distinctly different ways in which organizations adopt it: (1) deploying OSS products in their operational environment as end users; (2) using OSS CASE tools in software development; (3) integrating OSS components into their own software systems; (4) participating in the development of OSS products controlled by another organization

* Corresponding author. Tel.: +34 954349174.

E-mail addresses: mdgallego@upo.es (M. Dolores Gallego), sbueno@upo.es (S. Bueno), fjracmon@upo.es (F. José Racero), j.noyes@bristol.ac.uk (J. Noyes).

¹ Tel.: +34 954349174.

² Tel.: +44 (0) 117 928 8560.

or community; (5) providing their own OSS products and relating to a community around the product; (6) using software development practices, often associated with OSS communities, within a company or consortium of companies (e.g. using practices like code sharing, peer reviewing, user contributions).

In general, all these forms of adoption need the support of educational and training activities (Gallego, Luna, & Bueno, 2008). In fact, the analysis of the relationship between training and the adoption of OSS is recurrent in the literature. In this sense, Carmichael and Honour (2002) concluded that the dynamic and responsive nature of OSS and the existence of freely available documentation and online communities offers an opportunity for educators, network administrators and software developers to participate in the development of resources appropriate to local needs while developing their own skills.

Also, this relationship between his adoption and the support of educational and training activities is treated in research whose objective is to analyze how it helps to hold a strategic position in a knowledge economy (Ajila & Wu, 2007; Yildirim & Ansal, 2011). In this way, many countries are promoting policies to favor its implementation. This is the case in the European Union (EU). It has defined several policy implementation areas that relate to OSS (Bouras et al., 2014) among which are the policies for the educational use of it and its integration in learning environments. Also, many developing countries consider it as a national strategic choice. For that, these countries have increased strategic preference for this software in e-government, knowledge networks and education systems (Yildirim & Ansal, 2011). In the same way, Rooij (2011) affirmed that in international education the adoption of OSS teaching and learning applications is relatively mainstream.

Education and training on OSS are relevant in order to ensure the diffusion from all stakeholder groups (Kemp, 2009) mainly end-users. Besides, end-users and support staff required training to take full advantage of it (Au, Carpenter, Chen, & Clark, 2009). Furthermore, many works study the role of a technology to enhance efficiency and effectiveness and the necessity of introducing some governance mechanisms with this purpose (Milinovic, Tingle, & Vrga, 2003). So, Noni, Ganzaroli, and Orsi (2013) made a dimensional comparative analysis to show the evolution of OSS governance with six categories of governance mechanisms: (1) modularization; (2) division of roles; (3) delegation of decision-making; (4) training and indoctrination (definition of formal procedures and requirements to acquire the status of committed developers); (5) formalization (the introduction of standardized tools and procedures to coordinate activities such as bug reporting, version management, freezing, and so forth); and (6) leadership (autocratic versus democratic). In this same way, Kemp (2010) considered that a training and awareness programmed is of the essence of good OSS governance to ensure that the principles of the OSS strategy and policy are understood and met throughout the organization. In addition, Spinellis and Giannikas (2012) highlighted that the direct intra-organizational network effects on the adoption of this type of technology are associated with the training, among other factors, such as the prevalence of a particular product within the organization where it enjoys advantages over a competing product in the areas of Information Technology (IT) support, and software provision.

Noteworthy in this respect is that all these studies show the necessity of developing training mechanics under an intra-organizational point of view without considering the previous training of the user in OSS. In this sense, the authors have observed that a gap exists concerning the impact of user experience and training on it in the acceptance of this technology. Besides, in a general way, the literature has not considered the possibility that their end-users have received training on these solutions during their education and its impact in the acceptance toward an OSS solution.

Our aim in this paper is to contribute to filling part of that gap. Our main objective is to analyze how OSS training received by the end-user in different educational stages influences acceptance and usage intention toward OSS.

2. Literature review

2.1. Prior research

Usage intention of technology is a research topic widely studied. We can identify hundreds of studies that attempt to analyze the usage intention of the technology from very different points of view (e.g. Hsiao & Yang, 2011; Hsu & Chiu, 2004; Karahanna & Straub, 1999; Teo & Noyes, 2011; Venkatesh & Brown, 2001; Venkatesh & Davis, 2000). All these studies have the objective of determining the factors that influence on the usage intention of the technology, such as social pressure, satisfaction, system support, tool functionality, tool experience, top management support, communication, cooperation, task-technology fit, argument for change, situational involvement, prior usage and training, among other many factors.

Several studies address effects of training on usage intention. Igbaria and Iivari (1995) concluded that training and educational programs may foster a feeling of self-efficacy, that is, the belief that one can develop the experience necessary to use effectively computers and strengthen confidence in one's ability to master and use them in one's work. Also, these authors added that such training and educational programs might emphasize the user friendliness of currently available microcomputers, and the availability of easy to use software packages which require little or no knowledge of programming. Besides, Igbaria, Zinatelli, Cragg, and Cavaye (1997) suggested that individuals without adequate training are likely to experience problems using the system and become reluctant to use the technology, thus defeating the purpose of introducing the new technology. In this same way, Agarwal, Prasad, and Zanino (1996) showed how user perceptions are reasonable predictors of usage intentions, and they recommend the design of user training programs.

Focusing on specific technologies, there are many studies that have examined the effect or impact of user training on user perceptions and usage intention. Karahanna and Limayem, 2000 analyzed the effect of user training on IT usage. They concluded that training was important in highlighting the usefulness of e-mail and in identifying how to take advantage of all the complex features involved in the use of the technology. In a similar way, Rouibah, Hamdy, and Al-Enezi (2009) found that availability of training programs is the strongest determinant of perceived ease-of-use of personal computers. In the case of Enterprise Resource Planning (ERP) systems, other authors, such as Bueno and Salmeron (2008) or Amoako-Gyampah and Salam (2004) showed there exist a positive relationship between training and perceived ease-of-use.

Other researchers have shown a positive effect of user training on perceived usefulness (Hung, Tang, Chang, & Ke, 2009; Lewis, Agarwal, & Sambamurthy, 2003). In this sense, Lewis et al. (2003) affirmed that training, as other institutional factors, has a highly significant influence on individual technology use, and therefore the usefulness of a technology. Similarly, the results of the study of Hung et al. (2009) provided evidence that training is an important factor in the implementation of public electronic administration.

In an OSS context, there is no work conducted with the intention of analyzing in depth this relationship between training and usage intention. Thus, it is important to investigate the educational and training factors that affect the organizations' acceptance of OSS.

Download English Version:

<https://daneshyari.com/en/article/350338>

Download Persian Version:

<https://daneshyari.com/article/350338>

[Daneshyari.com](https://daneshyari.com)