Chapter 15
Role of Usability in
E–Learning System:
An Empirical Study of OWASP WebGoat

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ABSTRACT

Amongst open-source e-learning systems, WebGoat, a progression of OWASP, provides some room for teaching the penetration testing techniques. Yet, it is a major concern of its learners as to whether the WebGoat interface is user-friendly enough to help them acquaint themselves of the desired Web application security knowledge. This chapter encompasses a heuristic evaluation of this application to acquire the usability of contemporary version of WebGoat. In this context of evaluation, the in-house formal lab testing of WebGoat was conducted by the authors. The results highlight some important issues and usability problems that frequently pop-up in the contemporary version. The research results would be pivotal to the embedding of an operational as well as user-friendly interface for its future version.

INTRODUCTION

Amongst the principal attributes of quality, usability is the one that appraises user interfaces (Nielsen, 2012). Usability has five major quality components (learnability, efficiency, memorability, error and satisfaction) which play a vital role in assessing the user friendliness of any product (Nielsen, 2012). It is a matter of enhancing as well as maintaining the user productivity, meanwhile meeting the desired quality metrics (Nielsen, 2012). The term e-Learning system, a learning platform, expresses a wide range of information and communication technology (ICT) system used to deliver learning and teaching processes (Pecheanu et al. 2011). It reduces the training cost in terms of providing less travelling and accommodation, ultimately lowering teaching cost.

Amongst a variety of e-Learning systems, OWASP WebGoat is the open source e-Learning system aiming at easing the facilitation of the penetration testing techniques. In this paper we explore
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the usability issues in WebGoat, so that its future versions can improve on usability aspects.

This paper is structured as follows: Section 2 highlights the related work in the field of usability. Section 3 covers the methodology and is followed by empirical data in section 4. Section 5 wraps up the paper by a conclusion.

RELATED WORK

Several studies have discussed the importance and benefits of usability. Nielsen (1994) introduced the perception of web usability by affirming that creation of easy navigation and spontaneously structured web pages helps user to search the requisite information easily. Krug (2009) have chalked out that there are many design rules available to achieve the usability in web applications and successful implementation of web usage. Usability has been explored in different settings like health (cf. Hatzilygeroudis et al. 2007), e-government (cf. Saeed et al. 2013), education (cf. Oliveira et al. 2011) etc. Katsanos et al. (2012) professed that usability is mandatory to any academic software as well. According to them usability assessment of any pedagogical software comprises of an understandable requirement, preceding its incorporation into the academic realm. Kakasevski et al. (2008) highlighted the quick boost of ICT infrastructures these days. Every educational institution finds it indispensible to make use of internet as a pivot for an interactive system. The quest for the ultimate erudition has resulted in the progression of computing (Kakasevski et al., 2008). Floyd et al. (2012) have brought to light some e-Learning environments such as virtual universitiess, education portals, complete online courses and electronic course supplements that have been recently surfaced in the contemporary scenario. To accomplish a competitive scenario, a lot of universities are offering online degrees and certificates solely depending on e-Learning systems. This pedagogical method is in a stark contrast to conventional pedagogical methodologies, though not substituting it entirely but expanding new horizons of knowledge to learners. Almarashdeh et al. (2011) have described that an e-Learning system is an e-environment that is used to sketch, execute and review a particular facilitating process. Generally, it offers gateways to create and deliver the syllabi, critically analyzing learner’s performance and monitoring his interest. Trainers find it feasible to design courses and execute their pedagogical skills at the platform of various institutions. Georgiakakis et al. (2005) have declared that developing intricate frameworks for monitoring the e-Learning system in both educational and professional scenarios require tailoring. Al-Khalifa (2010) described consumer approval with e-Learning system using questionnaire method and suggested further usability studies to be pursued in order to assess an e-Learning system encompassing various usability evaluation techniques. Fogie (2003) has highlighted the need for learning web application security, as it is one of the major concern which ideally requires a safe infrastructure, where developers understand the new technologies as well as attacker learn how to exploit them. To accomplish this purpose OWASP (open web application security project) designed an open source e-Learning system WebGoat, offering an opportunity to web developers as well as professionals to understand web application security (Livshits, 2005). Fogie (2003) has pointed out, contrary to other learning environment encompassing security such as Found stone’s Hackme series and Badstore, WebGoat was initially perceived merely to offer e-Learning environment for learning penetration testing techniques rather than focusing on the usability evaluation itself. In this paper we focus on usability evaluation of WebGoat (shown in figure 1), using heuristic evaluation.