



ISSN: 0975-766X
CODEN: IJPTFI
Research Article

Available Online through
www.ijptonline.com

MOTIVATING EFFECTIVE ICT USERS' SUPPORT THROUGH AUTOMATED MOBILE EDU-HELPDESK SYSTEM

***Ambrose A. Azeta¹, Nicholas A. Omoregbe², Daniel Gberevbie³, Ochei Ikpefan⁴,
 Charles K. Ayo⁵, Sanjay Misra⁶ and James T. Williams⁷**
 Covenant University, Ota Ogun State, Nigeria¹²³⁴⁵⁶⁷
Email: ambrose.azeta@covenantuniversity.edu.ng

Received on: 20.10.2016

Accepted on: 25.11.2016

Abstract

An automated helpdesk system is meant to eradicate some of the barriers of reaching the Information and Communication Technology (ICT) technical staff to carry out repairs of ICT products and services in an educational institution. The problems faced with the existing ICT user support system include time wasting, difficulty in communication, and slow response to fix ICT related faults. The objective of this study is to develop an Automated Mobile Edu-Helpdesk System (AMES) for effective information dissemination, efficient management of operations and to resolve ICT challenges in higher education. The research methods adopted include unified modelling diagrams for design, Java and XML (Extended Mark-up Language) for Android application development as front end, while Hypertext Preprocessor (PHP) was used as the server side programming tool. MySQL database was used as backend.

Findings: The findings from the usability survey shows a good usability based on total rating of 4.09 out of 5 point scale. The benefits of the system include creation of a medium for non teaching and teaching staff to pass their complaints or messages to the technical department for speedy attention; and provision of better and faster operational processes which will reduce time spent on documentation. The automated Edu-Helpdesk system is more reliable, effective and convenient than the manual method in reporting cases of faulty ICT product and services within the university community.

Keywords: Automated mobile helpdesk system, Higher education, Information management System, university community.

1. Introduction: Today with practically everybody having a cell phone such as iPads, iPhones, and an Android based smartphones; access to remote data while on the move has become indispensable. In the past years, the face-to-face

campus culture was the norm. Some universities used to have series of data communication networks and devices that were uncoordinated and not effectively used. Today, however, many universities now harnesses the effective use of smart devices as well as wired or wireless technology to create a community of connected personnel and devices. Mobile application development has been steadily growing, both in terms of revenues and job creation¹, in several sectors including learning environment. An increasing number of students are using these smart media devices such as notebooks, Android devices (mobile and tablets), iPads and iPods for helpdesk purposes.

Helpdesk is sometimes referred to as service desk. Although the terms are sometimes used interchangeably, the help desk and the service desk are different. The help desk is an effective support center that assists customers in maximizing their use of technology. In contrast, the service desk is not only dedicated to providing excellent technical support but is tightly coupled with all of the IT processes and concentrates on the business needs of the customer and the enterprise². Diagnosis is important in many applications³.

A mobile automated helpdesk application is meant to eradicate some of the barriers of ICT usage in an institution. Today's universities are more technology savvy than before to continue to remain in academic business. The popularity of alternative media devices such as the iPads and iPod and in recent times, Android devices have created new possibilities for accelerating most campus activities, fostering communication and consuming content especially in an IT-driven institution. In addition, these devices have wireless capabilities, which have enabled staff and students to report complaints through the internet or intranet instead of using paper and telephone calls.

In the manual system of ICT helpdesk system in higher institutions, when a user have an ICT related problem such as printer not printing or PC not booting, the user places an intercom or GSM call to the IT support staff to report the problem.

The first point of contact is the ICT helpdesk where effective frontline support to all internal and external end-users in a timely manner is provided. Helpdesk staff communicates with customers/users to manually update their call progress, monitor and carry out repairs to ensure that challenges are resolved. The problems of manual system include among others: time wasting to get ICT problems solved and slow response on the part of ICT support staff. The process of reporting a physical ICT problem to the helpdesk center is cumbersome and stressful. Paper forms have to be filled and official memos have to be written and submitted to helpdesk department before receiving attention.

An efficient adoption of automated helpdesk system is based on the success stories recorded in A lot of helpdesk systems have been in use across different domains in education, customer service, telecommunication companies, government and banking.

Some of the existing helpdesk systems include Zendesk, Mojo Helpdesk, Tender Support System, Freshdesk and Manage-Engine Servicedesk Plus. Several researches that relates to helpdesk system exist in literature. The study by Foo et al⁴, highlighted the design and development of a web-based intelligent helpdesk support environment, WebHotLine, to support the customer service centre of a large multinational corporation in the electronics industry.

In the area of providing intelligent or agent-based helpdesk system, some studies were reported in literature. The aim of the study by Kang et al⁵ was to develop a help desk information retrieval mechanism suitable for a wide range of users and to provide a way of easily maintaining the system.

The prototype developed for use over the World Wide Web combines keyword search and case based reasoning to provide both rapid focusing on a part of the help information and guided interaction when the user is unclear about appropriate keywords. Other studies that utilized case-based reasoning include (Kolodner⁶; Kriegsman and Barletta⁷). Logan and Kenyo⁸ present a complete description of a helpdesk software solution, its development and deployment within US West Communications, and its emphasis on user empowerment. Tand and Todo⁹ identified a full function of new Service Desk and how to set up a good Service Desk. The study emphasized that enterprises should take proper measures in building a mature Service Desk to ensure successful implementation. In the same way, Brown¹⁰ highlighted top 10 considerations when evaluating helpdesk software.

The objective of this study is to provide some findings on efficient ICT users' support through automated mobile Edu-Helpdesk system.

The system will improve user support services for information dissemination and a medium for assigning technicians to resolve IT challenges in higher education. The system requirements was gathered and analyzed. The system was modeled, designed and implemented on mobile platform. The helpdesk system will be of great assistance to lecturers and technicians for solving ICT technical problems.

This study is structured as follows: Section two above contains introduction. Section two comprises of modeling an Edu-Helpdesk system. The system implementation of Edu-Helpdesk system is contained in section three. The evaluation and

discussion of results is contained in section four. While section five, concludes the paper and highlights some recommendations.

2. Modelling EDU-Helpdesk System

The Unified Modeling Language (UML) Use Case Diagram in Figure 1 is a general purpose visual modeling language that is used to specify, visualize, construct and document the dependent result of the Edu-Helpdesk system. This use case diagram shows the interaction and actions the technician can perform such as login, view ticket and answer ticket.

Figure 1: Use Case for Technician

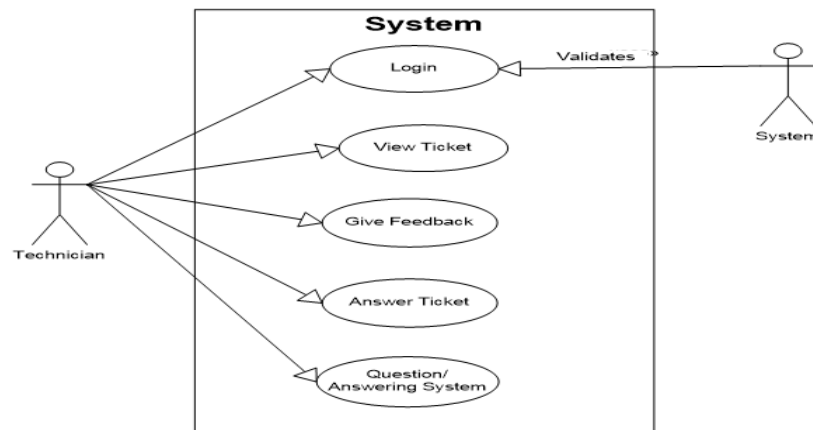
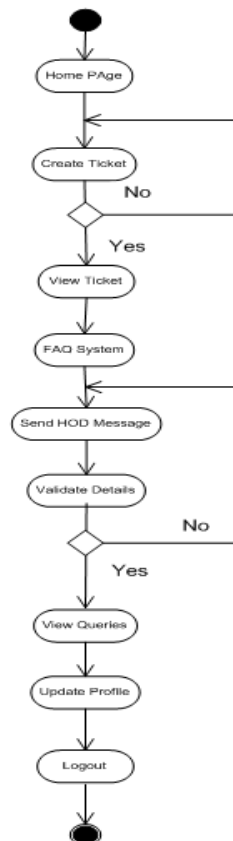
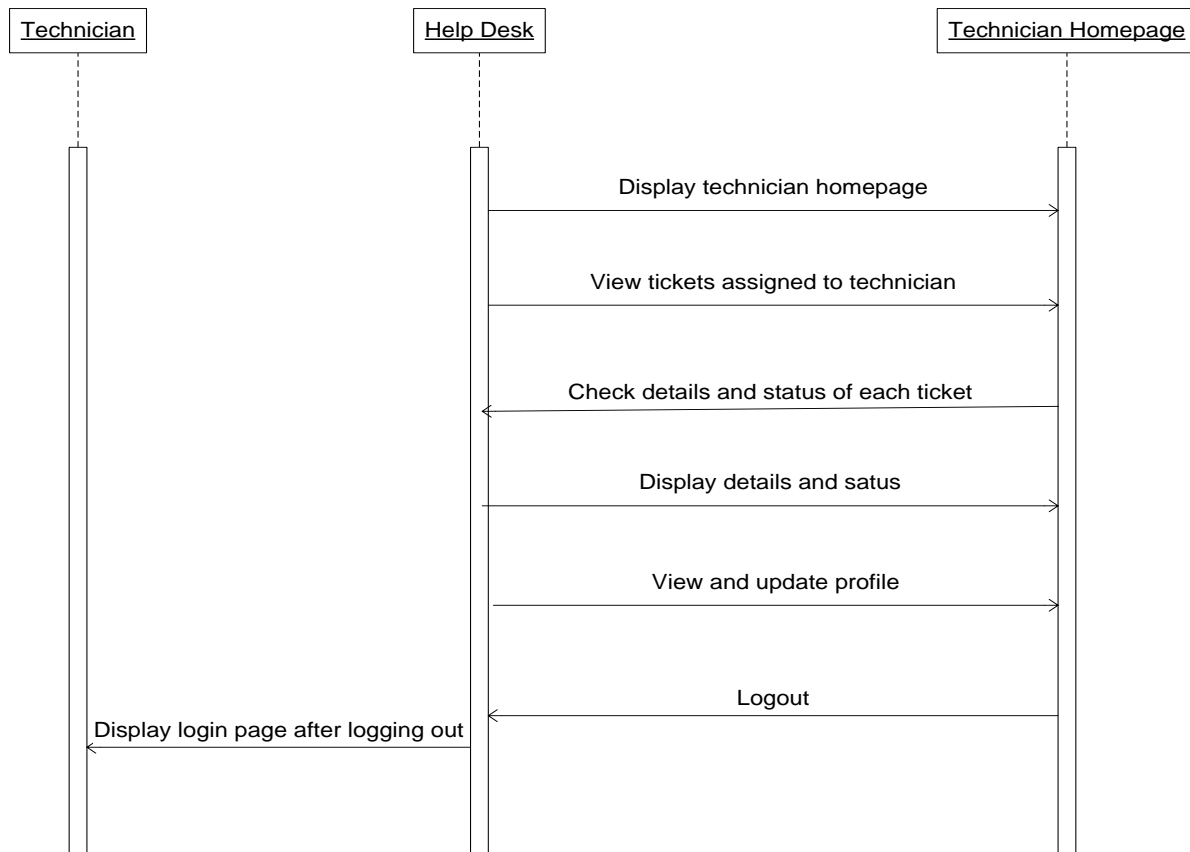


Figure 2: Activity Diagram for Lecturer.



The Activity diagram in Figure 2 shows the various activities a lecturer goes through in reporting an ICT related problem until when a solution is provided. The sequence diagram in Figure 3 shows how the various technical personnel in helpdesk departments interact with the system. The sequence diagram starts with a display of home page and ends with login page after a successful login.

Figure 3: Sequence diagram for technician



3. Implementation of Edu-Helpdesk System

In meeting the focus of this study, which is providing a system for the effective and efficient management of operations and technical difficulties in institutions, the following tools were engaged in the system development: Java and XML for the Android applications, XAMPP as the web server, Hypertext Preprocessor (PHP) as server side programming language, and MySQL as database. The application can be used by any institution that is willing to take advantage of the evolution of information technology to fast track the process of supporting users in ICT environment.

The Edu-Helpdesk has several advantages over the existing manual helpdesk system in use. The major advantages are as follows (i) a chat feature provides a mobile means of instant messaging between lecturers and other users (technicians and administrators inclusive), (ii) the system gives a simple approach to users to help themselves and rapidly solve what

they require, and minimize their disappointment, and (iii) provides structured and on-time handling of all changes in IT organizations.

However, the new Edu-Helpdesk has some demerits such as (i) Connection: If the staff, technician or server is not connected to the internet, and (ii) Lack of

Android powered devices: Some of the staffs or technicians do not use an Android powered device and the application only works on an Android device. The register page (see Figure 4) contains a form which requires “only lecturers” to register before they can gain access to the system. All information filled in the form are saved into the database. The create ticket page (see Figure 5) enables lecturers to create tickets and make complaints, and also report challenges.

Figure 4: Register Page.

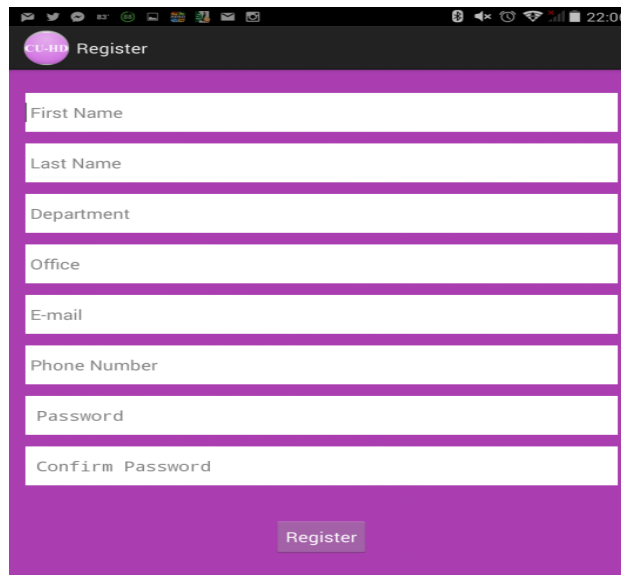
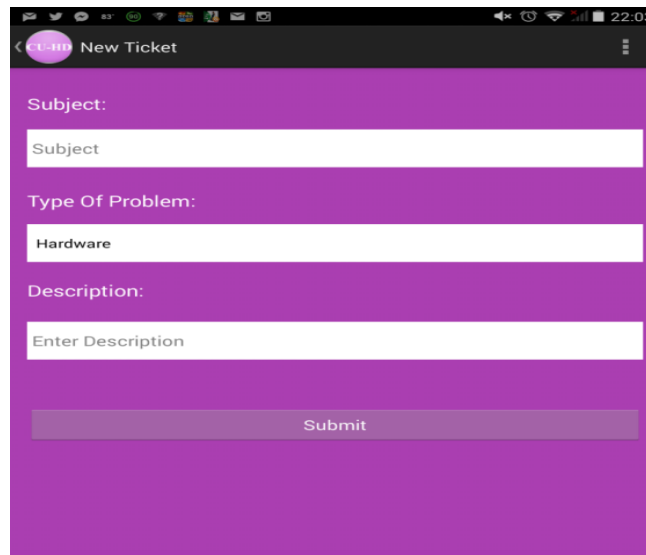
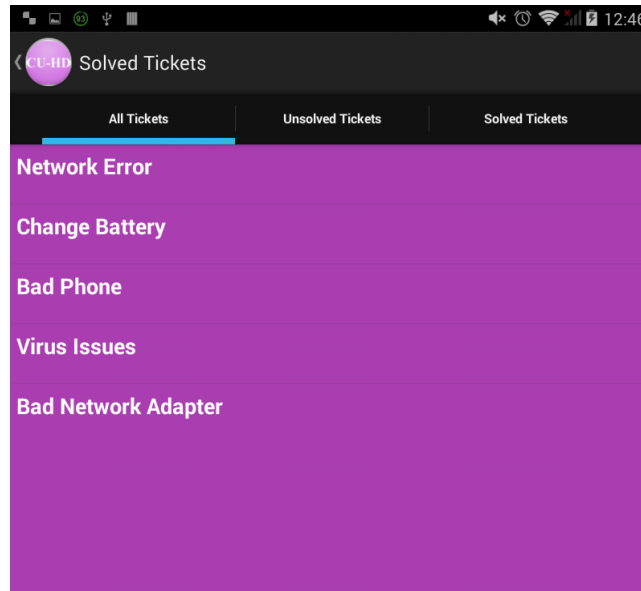


Figure 5: Create Ticket Page.



The view ticket page (see Figure 6) displays tickets that have been made by a staff (both the pending and solved tickets). The send head message page (see Figure 7) allows the technicians to report issues to a head of a technical department. In cases where the technician has not fixed the problem, the staff can inform the head.

Figure 6: View Ticket Page.



Source: Compiled by the researchers.

Figure 7: Send Head Message Page.

 A screenshot of a mobile application interface titled 'Send Head Message'. The form has a purple background. It contains three input fields: 'Subject:' with the text 'Network Adapter', 'Technician Assigned:' with the text 'ivy', and 'Description:' with the text 'My Network adapter is bad. Please help solve this problem. Thank you'. At the bottom of the form, there is a 'Send' button.

On the Feedback Page (see Figure 8), the head of department can give feedback to staff. All information filled in the form are saved into the database. The Frequently Asked Questions (FAQ) System Page (see Figure 9) contains information on how to solve common problems and issues that could occur in the office. It is an alternative to creating tickets and requesting for a technician's help.

Figure 8: Feedback Page.

View Query

Subject : Hard Drive Problem

Description : My Hard drive has still not been fixed.

From : ogundipe.ibk@yahoo.co.uk

Technician Assigned: ivy@gmail.com

Feedback :

The technician has been away for sometime. A replacement will be sent to attend to you. Sorry for the inconvenience.

Send

Figure 9: The FAQ System Page.

FAQ System

My Network Adapter is not working

First, try using the Network Adapter troubleshooter to automatically find and fix some problems.

- Open the Network Adapter troubleshooter by swiping in from the right edge of the screen, tapping Search , entering troubleshooting in the search box, and then tapping or clicking Troubleshooting.
- Tap or click Network and Internet
- Tap or click Network Adapter
- Follow the instructions on your screen.

Windows Cannot Boot

Re-intall windows or Perform Recovery on the system. If problem still persists, contact the CSIS Department

Bad Router

I cannot upload Lecture Notes on Moodle

Blue Screen

Restart your system or check your hard drive

Intercom is not working

4. Discussion and Evaluation

The mobile helpdesk system will enable administrators, lecturers, technicians and heads of department to get involved in the administrative process to enable them easily perform their work and resolve problems. It aims to effectively reduce manual administrative processes within the university so that computer systems can be effectively utilised with little or no down time. The system also reduces paper works and delays in meeting lifeline for solving ICT related problems. The adoption of this mobile-based help desk system will enhance the efficiency required of the institution's administrative and technical processes. Institutions of higher learning such as Covenant University are assured of smooth management of problems or complaints, thus bringing them into the realisation of their desired vision.

4.1 System Evaluation

The Edu-Helpdesk system was evaluated to determine the usability of the system. Several usability approaches exist, but the technique known as Cognitive walkthrough strategy¹¹⁻¹² was engaged in this study. The survey instrument used was questionnaire. It has five sections namely: background information, task completion speed, ease of use and interface

navigation with the system. A total of 71 copies of the questionnaire were administered to students but only 62 responses were received. Random sampling technique was used in the selection process. The 71 sample space were drawn from non teaching (31) and teaching staff (40) in five departments in the university including Computer and Information Sciences, Mathematics, Architecture, Estate and Biological Sciences department. The questions were designed using five point Likert-scale where 1= strongly disagree, 2=disagree, 3=undecided, 4=agree and 5=strongly agree.

As shown in Figure 10, the analysis of the main survey question attributes reported the following mean scores: Task Completion Success (4.00, 25%), Task Completion Speed (4.37, 27%), Ease of Use (3.82, 23%) and Interface Navigation (4.16, 25%). The resultant total average score for all attribute elements gave 4.09. Several usability studies suggest that system with “Very Bad Usability” would have 1 as mean rating, “2 as Bad Usability”, 3 as Average Usability, “4 as Good Usability” and “5 as Excellent Usability”. It was proposed in Sauro & Kindlund¹³ that “Good Usability” should have a mean rating of 4 on a 1-5 scale and 5.6 on a 1-7 scale. It can therefore be concluded that the prototype system presented in this study has “Good Usability” based on the average total rating of 4.09.

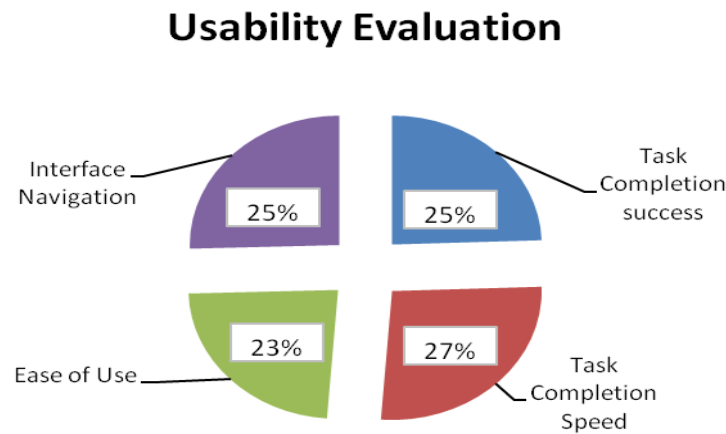


Figure 10: Analysis of Usability Attributes.

From the analysis, the study found that Ease of use has the lowest rating of 23%. The limitations of a mobile device accounted for this low factor. It is expected that as users get more acquainted with the use of the mobile application, the rating for Ease of use will improve.

5. Conclusion and Recommendations

In this study, an Automated Mobile Edu-Helpdesk System (AMES) was provided towards efficient management and resolution of ICT challenges in higher education. The system was evaluated to determine the usage level among students

and faculty in academic institutions. The usability attributes includes task completion success, task completion speed and interface navigation had a comfortable usability factor. However, the ease of use was low as a result of the effect of miniaturisation of mobile device, particularly the small screen key pad.

Problem management processes and activities are robust and dynamic as such, there will be a need for future review and improvements on the system. It is worthy of note that the system should be placed within the institutions internal network to fully effect the goal of making it primarily for the university. As an institution, Covenant University should explore the mobile helpdesk system to service ICT related products. When setting up the new mobile helpdesk, the installation should be considered from three different perspectives: process, people and tool.

References

1. Cho J, Kang H, Kim S. A Mobile Application Development Tool based on Object Relational Mapping Solution. *Indian Journal of Science and Technology*. 2015 Aug, 8(18), Doi no:10.17485/ijst/2015/v8i18/75937
2. Robertson, KE. Help Desk vs. Service Desk: Which One is Right for You?. NUMARA Software White paper. KR Consulting. 2005.
3. Karthiga, M.,Justin Samuel, S (2014), “Emergency spybot to detect and to help human in disaster “, *International Journal of Applied Engineering Research*, Volume 9, Number 14, pp. 2487-2494.
4. Foo S, Hui SC, Leong PC. A Web-based Intelligent Help Desk Support Environment. *International Journal of Systems Science*. 2002, 33(6), 389-402.
5. Kang BH, Yoshida K, Motoda H, Compton P. Help Desk System with Intelligent Interface. *Advanced Research Laboratory*. Hatoyama, Saitama, Japan. 2002.
6. Kolodner JL. A Process Model of Case-Based Reasoning in Problem Solving. In the Ninth International Joint Conference on Artificial Intelligence. 1985 1 (pp. 284-290). Los Angeles, USA: Morgan Kaufmann.
7. Kriegsman M, Barletta R. Building a Case-Based Help Desk Application. *IEEE Expert*. 1993, December, 18-26.
8. Logan D, Kenyon J. HELPDESK: Using Artificial Intelligence (AI) to Improve Customer Service. *Proceedings of AAAI*. 1992.
9. Tang X. Todo Y. A Study of Service Desk Setup in Implementing IT Service Management in Enterprises. *Technology and Investment*, 2013, 4, 190-196.

10. Brown, VF. Evaluating ITIL Help Desk / Service Desk Software Top 10 Considerations. 2007.
11. Rieman MFJ, Redmiles D. Usability evaluation with the cognitive walkthrough. Proceedings of CHI '95, ACM. 1995.
12. Ayo C, Azeta A, Oni A. E-Democracy: An Enabler for Improved Participatory Democracy. Chapter 18, IGI Global, Handbook of Research on E-Government in Emerging Economics: Adoption, E-Participation, and Legal Frameworks. A Book published in the United States of America by Information Science Reference (an imprint of IGI Global). 2009, 374-390.
13. Sauro J, Kindlund E. A method to standardize usability metrics into a single. ACM, CHI, April 2-7, Portland, Oregon, USA, 2005.