Consistency as Indicator of Usability for Social Software's

Nelson Bogomba Masese[1*] ,Simon Maina Karume [2]

* Department of Computer Science, Kabarak University, Kenya,

Department of Information Technology, Kibabii University, Kenya

[2] Department of Computer Science, Laikipia University, Kenya

email: mcanelson @gmail.com

Abstract: - *Background/ Objectives:* Consistency is recognition of the fact that it is easier to do things in a familiar context. Consistency makes software applications more comfortable to use the objective of the paper is to evaluate software consistency as an indicator of usability for social software's. *Methods/Statistical analysis:* A sample of 345 respondents was selected. The data was collected through the use of questionnaires and interview targeting mobile social users in 11 constituencies of former Rift valley province of Kenya. The researcher purposively sampled WhatsApp, Facebook and Twitter as software's used in this study. Descriptive statistics were used to analyze the data. *Findings:* This finding indicated that that 30.1% of the respondents agreed that the interface is consistent in the whole application in Facebook, followed by 15.4% in WhatsApp while 4.3% agreed in Twitter. Regarding whether icons and images are consistent in the whole application, it was reported by 36.8% of the respondents to be consistent in WhatsApp while Facebook users confirmed 16.5% while Twitter users were 6.7%. The findings further indicate that the social software becomes more consistent its usability increases, the consistency of shortcut keys with the operations, consistency of color, type and fonts displays influence usability of the social software. The paper has provided insights that consistency is vital, software designers should consider it in the software development process. *Improvements:* there is need to conduct further studies on other social software to confirm if these results are in line with all social software.

Keywords: Consistency, Usability, Social Software

----

1. Introduction

The mobile social software should offer the same or similar functionality from comparable situations, and familiarly, same or similar actions should yield the same response, this means that we expect the same or similar components to look alike and to respond similarly on user input [1].

Consistency can be expressed regarding the form of input expressions or output responses concerning the meaning of actions in some conceptual model of the system. For example, before the introduction of specific arrow keys, some word processors used the relative position of keys on the keyboard to indicate directionality of operations [2].

Consistency is not a single property of an interactive system that is either satisfied or not satisfied. Instead, consistency must be applied relative to something. Thus we have consistency in command naming or consistency in command or argument invocation. Another consequence of consistency has to be defined concerning some other feature of the interaction is that many other principles can be reduced to qualified instances of consistency [3].

Consistency serves two purposes in designing graphical user interfaces. First, a consistent look and feel makes it easier for users to learn to use the software. Once the essential elements of dealing with an interface are learned, they do not have to be relearned for a different software application. Second, a consistent user interface promotes reuse of the interface components [4,5].

Graphical user interface systems have a collection of frames, panes, and other view components that support the everyday look. They also have a collection of controllers for responding to user input, supporting the familiar feel.[6] Often, both look and feel are combined, as in pop-up menus and buttons. These components can be used by any program [7].

Usability is the ease of use and learnability of a human-made object such as a device. In software engineering, usability is the degree to which a software can be used by specified consumers to achieve quantified objectives with effectiveness, efficiency and satisfaction in a quantified context of use[8] Usability differs from user satisfaction and user experience because usability does not directly consider usefulness or utility of the software [9].

The objective of the paper is to assess the effect of software consistency as an indicator of usability for social software's, also this paper will provide insights to assist software engineers to improve their software products in a way that best supports easy usability of the users. Rest of the paper is organized as follows, 2.0 presents related works, 3.0 presents the methodology used in this paper, 4.0 presents the results of the data collected for this paper, and finally, 5.0 provides the conclusion and recommendation of the paper.

2. Related Works

ISO defines usability as "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use." The word "usability" also refers to methods for improving ease-of-use during the design process. [10].
According to Nielsen and has written a framework of system acceptability, where usability is a part of usefulness and is composed of the following sub-attributes that include

learnability that describes how easy is it for users to accomplish basic tasks the first time they encounter the design[11]. Secondly efficiency once users have learned the design, how quickly can they perform tasks thirdly memorability it entails when users return to the design after a period of not using it, how quickly can they re-establish proficiency fourthly errors it includes how many errors do users make, how severe are these errors, and how quickly can they recover from the errors lastly user satisfaction it includes how pleasant is it to use the design [12].

Usability design considers who the users are, what they know and how they learn users' general backgrounds and the context in which they use a given product [13]. It also considers whether users accomplish the tasks at the desired speed, the training required to use the program, supporting materials available to help users, the chance of recovery from errors and the program's ability to meet the needs of the disabled user [14].

When the system has software consistency, it influences usability allowing It is easy for the user to become familiar with and competent in using the social software user interface during the first contact with the software and It should be easy for users to achieve their objective through using the social software. If a user has the goal of posting a picture, a good design will guide him/her through the most natural process to post[15].

2.1 Usability Evaluation Methods

In usability, the two common expert-based usability evaluation methods are Heuristic evaluation like Nielsen, (1994), and Cognitive walkthrough [16]. Both methods aim to provide evaluators with a structured method for examining and reporting problems with an interface. The heuristic method provides a simple list of design guidelines which the evaluator uses to examine the interface screen by screen and while following a typical path through a given task. The evaluator reports violations of the guidelines are likely to cause user problems while utilizing the interface [17].

In the cognitive walkthrough method, the evaluator first determines the exact sequence of correct task performance, and then estimates, on a screen by screen basis, the likely success or failure of the user in performing such a sequence

[18]. In both methods, the expert must make an informed guess of the likely reaction of users and explain why specific interface attributes are likely to cause users difficulties. A cognitive walkthrough is useful to understand the user's thought processes and decision making when interacting with a system, especially for first-time or infrequent users [19].

Heuristic methods is based on design guidelines and ultimately reflect the expert's judgment of how well the interface conforms to good design practice. The cognitive walkthrough method concentrates more on the difficulties users may experience in learning to operate an application to perform a given The most common model-based approach to estimating usability is the Goals, Operators, Methods, and Selection (GOMS) method. 20]. GOMS is a family of predictive models of human performance that can be used to improve the efficiency of human-machine interaction by identifying and eliminating unnecessary user actions [21].

A cognitive psychology-derived framework that casts user behaviour into a sequence of fundamental units such as moving a cursor to given screen location or typing a crucial well-practised sequence which is allocated time estimates for completion based on experimental findings of human performance from psychology [22].

Benchmarking creates standardized test materials for a specific type of design. Four essential characteristics that are considered when establishing a benchmark include time to fix errors, time to learn applications, and the functionality of the system[23]. Once there is a benchmark, other designs can be compared to it to determine the usability of the system. Many of the common objectives of usability studies, such as trying to understand user behaviour or exploring alternative designs, must be put aside. Unlike many other usability methods or types of labs studies, benchmark studies more closely resemble true experimental psychology lab studies, with more significant attention to detail on methodology, study protocol and data analysis[24].

2.2 Aspects of Consistency

Consistency applies to many elements within the social software. There are main features this study considered are as follows:

Language: The language should be natural to learn, efficient in the execution, friendly user interface, proper error handling mechanism, excellent user interface and a reasonable number of steps during the execution. Consistent language will make your social software to appear more straightforward and more authoritative [25].

User Interface Elements: The user interface determines how commands are given to the computer or the program and how information is displayed on the screen. [26] The most common user interfaces include command language mostly ideal for experts who can master and recall commands used, Menu interface it is used when the user selects on the available options on the screen [27]. Lastly, a Graphical user interface where the user enters commands by selecting and clicking on icons displayed on the screen [28][29].

Layout: The social software should be free in the way that you laid out your software pages. One might decide that primary navigation should be on the right of the screen, secondary navigation on the bottom, and content on the top left. However, existing general practice constrains what you can do. But the layout also includes navigation on the top or left (or both) and search on the top right [30].

3. Methodology

The paper adapted mixed research design. The primary data used was collected from a survey carried at has eleven constituencies of former Rift valley province, targeting mobile social software users. The survey was used as it allows you to measure the significance of the mobile social software on the overall population, the target population was 6,000 and the sample size 345 of respondents was selected. Interviews were used to validate the data that was collected by the questionnaires since domain experts were interviewed the sample size of 40 respondents was selected. The study achieved 97.3% response of the target. This response rate was considered appropriate for analysis and reporting as supported by [31] indicating that a response rate of 70% and above is excellent, the results are tabulated in the next section.

4. Results

Respondents General Information

The following section presents demographic results for the study.

4. 1. Age

The analysed data indicated that the respondents with age bracket of 21- 40 years were 47.5% of the total population. This was followed by 24.1% who were between 41 -60 years. It was noted that respondents within the age bracket 1-20 years were 16.5% and finally, only 11.9% of the respondents had 61 years and above. The proportion of respondents by age was analyzed and presented as follows in Table 1.

Table 1: Age of Respondent

Age Category	Frequency	Percentage
0 - 20 years	57	16.5
21- 40 years	164	47.5
41 - 60 years	83	24.1
61 years and above	41	11.9
Total	**345**	**100**

4.2. Gender

Findings showed that the female respondents were 58.3% whereas female respondents were 41.7%. This implies that there was a significant difference in proportion between males and females. It was evident therefore that there were more female than male respondents in the study. The proportion of respondents by gender was analyzed and presented as follows in Table 2.

Table 2: Gender

Variable	Frequency	Percentage
Male	144	41.7
Female	201	58.3
Total	**345**	**100**

4.3 Educational Level

The results revealed that 71.3% of respondents had college/university education followed by secondary school leavers with 28.4% and finally primary school leavers were 10.3%. This implies that respondents varied regarding their educational background making them legible to participate in the study. The proportion of respondents by Educational level was analysed and presented as follows in Table 3.

Table 3: Educational Level

Variable	Frequency	Percentage
Primary	1	0.3
Secondary	98	28.4
College/ university	246	71.3
Total	**345**	**100**

4.4 Software Consistency

Descriptive statistics were computed to determine respondent's view concerning software consistency of the social software. The findings in table 4 revealed that 31.3 % of the respondents affirmed that the hierarchical arrangement of commands is consistent in WhatsApp followed by Facebook with 13.0% and finally Twitter with 5.7%. It was however noted that 49.9% of the respondents contested the claims that hierarchical arrangement of commands is consistent across all the three networks under investigation. It was comprehended from the findings of the study that 69.9% of the respondents agreed that the shortcut keys are consistent with the operations across the three networks while only 30.1% disagreed.

It was illustrious that 30.1% of the Respondents agreed that the interface is consistent in the whole application in Facebook, followed by 15.4% in WhatsApp while 4.3% agreed in Twitter. Regarding whether icons and images are consistent in the whole application, it was reported by 36.8% of the respondents to be consistent in WhatsApp while Facebook users confirmed 16.5% while Twitter users were 6.7%. Concerning Facebook social software, it was reported by 20% of the respondents that similar operations are handled consistently while 42.6% in WhatsApp and 7.2% in Twitter.

The results further indicated close to 35.9%, and 36.8% of the respondents in WhatsApp affirmed that errors are consistently handled and that there is a consistent arrangement of data posted by the user respectively. it was also observed that 40.3% of the respondents disagreed that errors are consistently handled and that there is a consistent arrangement of data posted by the user. In summary, WhatsApp software consistency is better than the Facebook and Twitter software. Regarding qualitative data, respondents gave a response on which among the official social media was more consistent. For those who chose WhatsApp, they reported that the instructions are a consistent and friendly interface. Secondly, for Facebook users, they affirmed that interface has updates making it more consistent and lastly Twitter was last regarding consistency.

Table 4: Software Consistency

Software Feature	Network Type					
	Facebook		WhatsApp		Twitter	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes(%)	No (%)
The hierarchical arrangement of commands is consistent	13.0	15.7	31.3	30.1	5.8	4.1
The shortcut keys are consistent with the operations	20.6	8.1	42.6	18.8	6.7	3.2
The interface is consistent in the whole application	30.1	13.3	15.4	31.3	4.3	5.5
Icons and images are consistent in the whole application	16.5	12.2	36.8	24.6	6.7	3.2
Similar operations are handled in a consistent manner	20.0	8.7	42.6	18.8	7.2%	2.6
Errors are consistently handled	18.8	9.9	35.9	25.5	4.9%	4.9
There is a consistent arrangement of data posted by the user	16.5	12.2	36.8	24.6	6.7%	3.2

Key:% =Percentages; Source: [32]

5. Conclusions & Recommendations

The findings indicated that consistency is a fundamental feature in the enhancing usability of the social software. To improve consistency, several methods have been adopted that include the language should be easy to understand by the end user, friendly user interface elements, simplified layout. Consistency ensures that users do not have to learn new representations for each task. Further, establishing design norms like following platform conventions allow users to complete new tasks without having to learn a whole new toolset. Usability is the best factor that balances between technical and human aspects of a software product. There is need to ensure usability characteristics are integrated well in software products to ensure its success.

In eventual consistency, the model should be developed to ensure designers make instructions detectable and well-positioned on the user interface so that application users would be more likely read them. The instructions must not be lengthy or extensive and should also make use of graphic elements to make them more appealing to their users to influence consistency and usability of social software's.

6. References

[1] Tovi Grossman, George Fitzmaurice, Ramtin Attar (2009). A Survey of Software Learnability: Metrics, Methodologies and Guidelines,CHI 2009 2009 Boston, MA, USA conference university. Issues in Science and Technology, 22(1),pp 1–13.

[2] Auden, W. H. (2013). Menu Selection, Form Fill-In, and Dialog Boxes. Designing the User Interface:

Pearson New International Edition: Strategies for Effective Human-Computer Interaction, pp223.

[3] Savery, C. (2014).Consistency maintenance in networked games (Doctoral dissertation).pp-60-62

[4] Tidwell, J. (2010).Designing Interfaces: Patterns for effective interaction design. "O'Reilly Media, Inc.".pp-50-54

[5] Goecks, J., Nekrutenko, A., & Taylor, J. (2010). Galaxy: a comprehensive approach for supporting accessible, reproducible, and transparent computational research in the life sciences.Genome biology,11(8), pp 86.

[6] Swartout, B., Patil, R., Knight, K., & Russ, T. (1996, November). Toward distributed use of large-scale ontologies. In Proc. of the Tenth Workshop on Knowledge Acquisition for Knowledge-Based Systems (pp. 138-148).

[7] Matejka, J., Grossman, T., & Fitzmaurice, G. (2013, April). Patina: Dynamic heatmaps for visualizing application

usage. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems ACM (pp. 3227-3236).

[8] Hashim, A. S., Ahmad, W. F. W., Nordin, S. M., & Jaafar, A. (2014). Usability study of free schools system for secondary schools in Malaysia. rIn User Science and Engineering (i-USEr), 2014 3rd International Conference on IEEE (pp. 198-203).

[9] Bollini, L. (2017). Beautiful interfaces. From user experience to user interface design. The Design Journal, 20(sup1), pp 89-S101.

[10] Bevan, N., Carter, J., & Harker, S. (2015,). ISO 9241-11 revised: What have we learnt about usability since 1998?. In International Conference on Human-Computer Interaction(pp. 143-151).

[11] Nielsen, J. (1999). Designing web usability: The practice of simplicity. New Riders Publishing.

[12] Issa, T., & Isaias, P. (2015). Usability and Human-Computer Interaction (HCI). In Sustainable Design Springer, London (pp. 19-36)..

[13] Gu, X., Gu, F., & Laffey, J. M. (2011). Designing a mobile system for lifelong learning on the move. Journal of Computer Assisted Learning, 27(3), pp204-215.

[14] Buxton, B. (2010).Sketching user experiences: getting the design right and the right design. Morgan Kaufmann publication.pp 89-90

[15] Shneiderman, B. (2010). Designing the user interface: strategies for effective human-computer interaction. Pearson Education India pp 100-102.

[16] Kelders, S. M., Pots, W. T., Oskam, M. J., Bohlmeijer, E. T., & van Gemert-Pijnen, J. E. (2013). Development of a web-based intervention for the indicated prevention of depression. BMC medical informatics and decision making,13(1),pp 26.

[17] Johnson, J. (2013).Designing with the mind in mind: simple guide to understanding user interface design guidelines. Elsevier.pp-45

[18] Abuali, A. N., & Abu-Addose, H. Y. (2011). A Comparative Study Of Techniques Used For Evaluating Web Page Quality Of The Public Organizations In Jordan - Amman. International Journal Of Academic Research,3(2).pp 56

[19] Wilson, C. (2013).User interface inspection methods: a user-centered design method. Newnes.pp 80-84

[20] Fu, K. K., Yang, M. C., & Wood, K. L. (2015). Design principles: The foundation of design. In ASME 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (pp. V007T06A034-V007T06A034). American Society of Mechanical Engineers pp 77 -80

[21] Gartenberg, D., Thornton, R., Masood, M., Pfannenstiel, D., Taylor, D., & Parasuraman, R. (2013). Collecting health-related data on the smartphone: mental models, cost of collection, and perceived benefit of feedback. Personal and ubiquitous computing,17(3), 561-570.

[22] Shafiq, M., Ahmad, M., & Choi, J. G. (2017). Public System Usability Analysis for the Valuation of Cognitive Burden and Interface Standardization: A Case Study of Cross-ATM Design.Journal of Organizational Computing and Electronic Commerce pp 54-67

[23] O'Neil Jr, H. F., Ni, Y., Jacoby, A., & Swigger, K. M. (2013). Human benchmarking for the evaluation of expert systems. Technology Assessment in Software Applications, pp13.

[24] Ritter, F. E., Baxter, G. D., & Churchill, E. F. (2014). Methodology III: Empirical Evaluation. In Foundations for Designing User-Centered Systems Springer, London.

 (pp. 353-380).

[25] Klöckner, A., Pinto, N., Lee, Y., Catanzaro, B., Ivanov, P., & Fasih, A. (2012). PyCUDA and PyOpenCL: A scripting-based approach to GPU run-time code generation. Parallel Computing, 38(3), pp 157-174.

[26] Beatty, K. (2013). Teaching & Researching: Computer-assisted language learning. Routledge pp 124-129.

[27] Jalon, J., Robert, J., & Paterson, T. (2012). U.S. Patent No. 8,185,839. Washington, DC: U.S. Patent and Trademark Office pp 67-78

[28] Shneiderman, B. (2010). Designing the user interface: strategies for effective human-computer interaction. Pearson Education India.

[29] Sandip Sharad Shirgave, Prof. S. V. Pingale, Prof. A. A. Rajguru, Prof. N. M. Sawant," Access Control Methodology for Online Social Network" International Journal Of

Computer Engineering In Research Trends Volume 2, Issue 5, May 2015, PP 293-295 , ISSN (Online): pp 2349-7084

[30] Neil, T. (2014).Mobile design pattern gallery: UI patterns for smartphone apps. " O'Reilly Media, Inc."pp 45-49

[31] Krejcie, R.V., & Morgan, D.W.(1970). Determining Sample Size for Research Activities. Educational and Psychological Measurement, 30, pp 607-610

[32] Masese Nelson, Samwuel Mbugua, Geoffrey Muchiri (2016). Research data for PhD thesis.

Author Profile

   Masese Bogomba Nelson holds masters of computer applications degree from Periyar university in India, currently a PhD student at Kibabii university, He is currently a lecturer in Information Technology at Kabarak University Kenya. His research interests are mobile applications and security.

Simon Maina Karume received his PhD in Information Technology from Masinde Muliro University of Science and Technology in 2014. He served as the computer science lecturer and ICT director at the same university between 2007 and 2014. He is currently   Associate Professor in Information Technology at Laikipia University Kenya.