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Evaluation on the usability and information content of three university library websites for improved standard of education based on heuristic principles

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Abstract

The purpose of the study was to evaluate three university library websites in Nigeria based on heuristic evaluation principles. The researchers focused on the usability and information content of the websites. This is a qualitative research based on observation, using heuristic checklist as the parameter for content and usability evaluation. A desktop research was carried out on three university library websites - Kenneth Dike Library, University of Ibadan, Nnamdi Azikiwe Library, University of Nigeria, Nsukka, Donald E. U. Ekong Library, University of Port Harcourt. Data were collected by observably assessing these library websites based on heuristic evaluation principles.. Data collected were discussed accordingly. The study found among others that the usability and information content of the selected library websites, were inadequate. The paper concluded that the university library websites were still underdeveloped. Recommendations made includes, mandatory periodic evaluation of the website for improvement, constant updating to maintain integrity, librarians' library website development involvement and website design enhancement.

Keywords: Evaluation of usability, heuristic checklist, information content, library websites, University libraries, Nigeria

Introduction

Information exists for the sole purpose of satisfying its users and the achievement of this purpose is measured in the usability, information content and overall effectiveness of its information services via its websites and other mediums. University libraries serve two complementary purposes of supporting the institution's curriculum and the research of the university faculty and students (Academic Library Association, 2009).

Standard of education is the educational standards that define the knowledge and skills students should possess at critical points in their educational career. It is an investment in people which brings great dividends to a society or country and when this investment is inadequately met, a society is bound to suffer a loss (Okoroma, 2007). Good education is imperative for the realization of national objective; on the other hand, education is a vehicle for development.

Any fall in standards at whatever level is a threat to the qualitative existence of every society.

University library having the mandate to serve the knowledge and information needs of the university community and combat illiteracy, becomes the center of attraction in full submission to aid in upgrading and upholding the standard of education. The library provides an environment conducive to scholarly research and study (The University of Rhode Island, 2006). It provides the information physically, electronically and virtually, making their presence felt online while educating the populace. The library offers selfless services thereby maintaining one of its reputations as the poor man's university, satisfying the information need of their users. Libraries provide pool of services and informational materials at little or no cost and aid their users in information literacy for

lifelong learning as well as in making informed decision. The libraries therefore need to step up their game in innovation of new technologies and enacting a standard library website.

Library website helps information professionals in efficient provision of information, facilitate its users to connect with the library 24 hours a day, enable conducting of research by students without physical presence but through its website (virtual visit), ask reference questions, conduct research in databases and even place interlibrary loan request electronically as posited by Connell, (2008), but when these few mentioned experiences are not enjoyed from an institution's library website by the users, the credibility of the content and usability of such library website becomes questionable.

Usability is one of the most important aspects of any website. According to Nielsen (2005), usability, measures how easy it is to use the interface, "the extent to which a product can be used by specified users to achieve specific goals with effectiveness, efficiency, and satisfaction in a specific text of use". The usability does not only evaluate the quality of a website but also provide managers with insight into potential problem areas (Yates, 2005). Hmood (2017) summarized usability to be a fundamental measure of how users operate the product to achieve their goals and essential in making systems easy to use and learn. The rapid developments in information technology have already laid a solid foundation for a new innovative evolution of university in the ongoing digital era across the globe. However, libraries are facing many challenges because of the new technological era where currents trends have immensely influenced the user perceptions, expectations and requirements towards information. It then becomes relevant for university libraries in particular to devise an improved means of information overall

processing through the effective development, use and maintenance of library websites. The accelerating pace of technological development has tremendously increased the ability to access, store, process, communicate and deliver information services to the desktop of the library's clients. The significant role played by web in businesses, entertainment, and education among others, have increased concern on the ways websites are developed and also the quality of information disseminated. The web growth changes the interaction and usability of information by people and has expanded the opportunity of web on different sectors and in the production of contents (Lopes & Carrico 2008). The modern trend and vast majority of library resources are now web enabled and so attention is being focused on designing user-friendly, easily managed and maintained library websites.

As posited by Elsevier library connect (2003), a website can be described as the collection of related pages which may include multimedia content, identified with a common domain name which is published in a common server or site. Website must be on related pages meant for a particular group of people, Organizations or NGOs. Website has two categories which are static and interactive website, an interactive website is the website that allow visitors or users to interact with the system or the owner of the website. Example of the interactive website is web 2.0 cum Lib. 2.0 mostly used in the library, while the static website is the site where information is captured but do not allow the user to edit or delete anything hence denying the visitors of the website the opportunity to interact (Elsevier Library Connect, 2003). The website is a way to make library made products available in the World Wide Web (www) by making internet resources available on a selective basis, and it is a communication tools where information about services, people,

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facility and collection about the hosting body can be found. As the number of library websites grew, it became necessary, to evaluate the usability of academic library websites in Nigerian Universities and its support to standard of education.

Evaluation, according to Hmood (2017), is the process by which the designers gather information about a systems usability to improve its user interfaces features. In evaluating the usability of a website, focus should be on the simplicity of using a software, system or interface for performing a particular task. The information content which was posited by collinsdictionary.com (2020) as the amount of information contained in something and the usability of the three academic library websites were carefully evaluated using heuristic evaluation principles.

Heuristic Evaluation propounded by Nielsen 1990 as cited in Nielsen (2005) is a cheaper method for quick and easy evaluation of websites focusing on the user interface. The website is evaluated in line with the heuristic principles to identify any positive or negative issues with the website usability for reference and future iterative design process. Heuristic evaluation contains ten relevant principles for evaluation which includes; Checking the visibility of system status, match between the system and the real world, User control and freedom, Consistency and standards, Error prevention, Recognition rather than recall, Flexibility and ease of use, Aesthetic and Minimalist design, Help users recognize, diagnose and recover from errors and Help and documentation (Nielsen, 2005). These principles are the best representations of how to ascertain the human interaction with the system while using the library website and therefore good for usability and information content quality evaluation thus lead to the evaluation on the usability and information content of Kenneth Dike Library website, University of Ibadan, Nnamdi Azikiwe

Library website, University of Nigeria, Nsukka and Donald Duke Ekong Library website, University of Port Harcourt for improved standard of education in Nigeria based on heuristic evaluation principles.

Objective of the study

The study was intended to evaluate the websites of three university libraries in Nigeria based on Heuristic evaluation principles. It set out to specifically evaluate the:

1. usability of the selected university library websites based on ten Heuristic principles and
2. information content quality of the library websites.

Scope of the study

The study covers the evaluation of three selected Academic library websites which includes; Nnamdi Azikiwe Library website, University of Nigeria, Nsukka, Kenneth Dike library website, University of Ibadan and Donald Duke Ekong library website, University of Port Harcourt based on Heuristic evaluation principles.

Literature review

Few researches have been carried out on website evaluation using heuristic method as seen in Astani and Elhindi (2008), who employed the heuristic evaluation method to evaluate the usability of the top 50 colleges and universities. The study was concluded by two experts who evaluated and rated the sites' information content, navigation, usability, customization, download speed and security. The author revealed that the tested websites had usability problem related mainly to old context and appropriate layout.

Noiwan and Norcio (2000) evaluated and compared the usability of two Thai and two United States academic websites, using web usability checklist that aimed to measure

the usability indexes to the sites. The checklist was categorized into four major sections: finding the information, understanding the information, supporting user tasks and presenting the information. Each guideline of the check list was presented as yes/no question. The result showed that the sites had several usability problems including lack of a site map, old content, lack of navigational tool and inconsistency problem. It further revealed that, the Thailand websites have additional problem such as ineffective internal search functions and language problems.

A related study by Obuezie and Osuchukwu (2017) evaluated the websites of three national libraries - national libraries of Nigeria, Ugandan and Namibia using heuristic principles. The visibility, navigable effects in promotion of research, national literature, heritage, and also the current status of the website were ascertained. The content of the checklist which was used as the instrument for data collection was built and assessed against the library website based on the ten principles of heuristic criteria. The study showed that the websites have web presence, navigable effects but with varying levels of services which creates room for improvement.

Akintunde (2004) noted that a few universities in Nigeria have functional websites; that most of them present incomplete information and have poor content even after a decade of website development. Nielson and Tahir, (2002) posited that an institution's homepage is its face, building's lobby and receptionist to the world.

Methods

This is a qualitative research using Heuristic evaluation checklist based on observation. A desktop research was carried out on three purposively selected university library websites in Nigeria, namely; Kenneth Dike Library website, University of Ibadan (UI), Nnamdi Azikiwe Library website, University

of Nigeria, Nsukka(UNN), Donald E. U. Ekong Library website, University of Port Harcourt(Uniport). These three (3) websites made up the population. Data were collected by observably assessing these library websites by three evaluators based on Heuristic Evaluation Principles as propounded by Nielsen in 1990. Heuristic Evaluation checklist was the instrument used for data collection.

Results and discussion

A set of tasks that were critical to the sites' success were developed and carried out by three evaluators (librarians) from three different locations, to assess and feedback on the usability and information content quality of the three library websites. The evaluation was based on the ten heuristics principles. On the completion of the task and submission of the feedback, duplicate feedbacks were weeded out, similar issues were combined as one while the remaining reports were compiled as findings. The checklist was prepared based on the heuristic evaluation ten general principles and ten information content elements expected to be contained in any academic library website. Data collected were reported accordingly. Where \checkmark = Applicable or Available, X = Not Applicable or NOT Available as the case may be, HP = Heuristic Principles, KDL = Kenneth Dike Library, NAL = Nnamdi Azikiwe Library and DEUEL = Donald E.U Ekong Library.

Research question one: What is the usability of the three selected university library website based on Heuristic principle?

This research question is answered with the data in Table 2.

The table reveals that NAL website lacks good visibility of system status (feedback), the three websites, maintains good Match Between the System and the Real World (Metaphor), KDL and DEUEL

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websites lacks User control and freedom (Navigation), DEUEL website lacks error prevention (prevention) as well as Recognition rather than recall (memory) in their website, NAL and DEUEL website maintains minimal or no Flexibility and Ease of Use (efficiency), NAL website lacks Help Users Recognize, Diagnose, and Recover from Errors (recovery) in its setup while KDL website lacks the applicability of Help and Documentation (help) in their website setup.

Research question 2: What is the information content quality of the university library websites?

This research question is answered with the data in Table 3.

The table contains data on the evaluation result of the information content quality of the three university library websites

studied. From the table, DEUEL website has site map, best identifiable title and a detailed history/ mission and vision of the library on its website. NAL website maintains good photo news, holds high amount of current contents, updates their library News, as well as records good presentation of library updates. KDL website has an identifiable library title, good links to the library services, well presented history and mission of the library and has information on the working hours of the library. The three libraries websites, all had good provision of photos on their website and active links to its physical and electronic information materials while some of the library websites lack few of the expected information contents.

Table 1: University library websites used

S/N	Library	Websites
1.	Kenneth Dike Library, UI	http://library.ui.edu.ng
2.	Nnamdi Azikiwe Library, UNN	www.unn.edu.ng/nnamdi-azikiwe-library/
3.	Donald E.U. Ekong Library, Uniport	http://library.uniport.edu.ng

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Table 2: Result on the usability of the library websites based on the ten Heuristic principle

S/N	Heuristic principles	(http://library.ui.edu.ng)	(unn.edu.ng/nnamdi-azikiwe-library/)	(http://library.uniport.edu.ng)
1.	Visibility of system status	✓	X	✓
2.	Match between the system and the real world	✓	✓	✓
3.	User control and freedom	X	✓	X
4.	Consistency and standards	✓	✓	✓
5.	Error prevention	✓	✓	X
6.	Recognition rather than recall	✓	✓	X
7.	Flexibility and ease of use	✓	X	X
8.	Aesthetic and minimalist design	✓	✓	✓
9.	Help users recognize, diagnose, and recover from errors	✓	X	✓
10.	Help and documentation	X	✓	✓

Table 3: Result on the information content quality of the library websites of the selected academic libraries

S/N	Information	(http://library.ui.edu.ng)	(unn.edu.ng/nnamdi-azikiwe-library/)	(http://library.uniport.edu.ng)
1.	The site map	✓	X	✓
2.	Identifiable library title	✓	X	✓
3.	How current is the content	X	✓	X
4.	Available photos of the library	✓	✓	✓
5.	Link to library services	✓	X	X
6.	Links to library physical / electronic collections.	✓	✓	✓
7.	Library News	X	✓	X
8.	History or mission of the library	✓	X	✓
9.	Library working hours	✓	X	X
10.	Presentation of library updates.	X	✓	X

Summary of findings

The following are the summary of the analysis of the evaluation using the heuristic evaluation principles:

1. All the three library websites are still underdeveloped and less maintained which is evident in their presentation of library updates where. They all had usability problem related to inappropriate contents and layout.
2. Eight (8) out of the ten principles were applicable in KDL website, seven (7) out of the ten HP and six (6) out of the ten HP were applicable in NAL website and DEUEL website respectively. It was observed that the NAL website is embedded in the university website which seriously affects the flexibility and visibility of

the library website, as it keeps giving error redirections.

3. On the information content quality, only seven (7) out of the ten elements expected to be contained in any academic library website were available in KDL website, five (5) out of the ten elements were available in NAL website and also five (5) out of the ten elements were available in DEUEL website, this record is very poor and needs to be improved.
4. Generally, DEUEL website performed poorly in this evaluation. NAL website proves to have a better usability as against the other two websites (KDL and DEUEL) while KDL has a better website layout among the three websites studied.

5. There is so much preference for electronic resources as they all holds valid subscriptions to a lot of educational databases. NAL website holds more current materials than the other two libraries websites and electronic materials could be easily downloaded in NAL website.

Conclusion

Library websites are considered a mirror to every Institution. The image and visibility of a library depends greatly on a well-developed website. The evaluation of the three university library websites' usability and information contents following heuristic evaluation principle by Nielsen 1990 as cited by Danino (2001) clearly revealed that the university library websites are still underdeveloped. These websites were seemingly developed as a routine organizational matter instead of conscious process of library promotion in ever growing user environment. KDL and NAL websites showed little outstanding qualities and some human computer interaction consideration during its development.

Based on the findings, the following are recommended:

1. KDL needs to improve on its aesthetic and minimalist design as well as help and documentation on its website, to improve richer content, active links and familiar navigation by the users.
2. DEUEL should make its prompt messages on error and prevention of its website more user-friendly.
3. NAL should improve on its information content to avoid users from getting frustrated while on virtual visit.
4. The three library websites are not very adequate in the usability and information content quality and these issue needs to be addressed. Quality content, accessibility, flexibility and usability of the library websites need to be developed.
5. Periodic evaluation should be made mandatory for all library websites. These will aid in detecting any error or poor functionality on time.

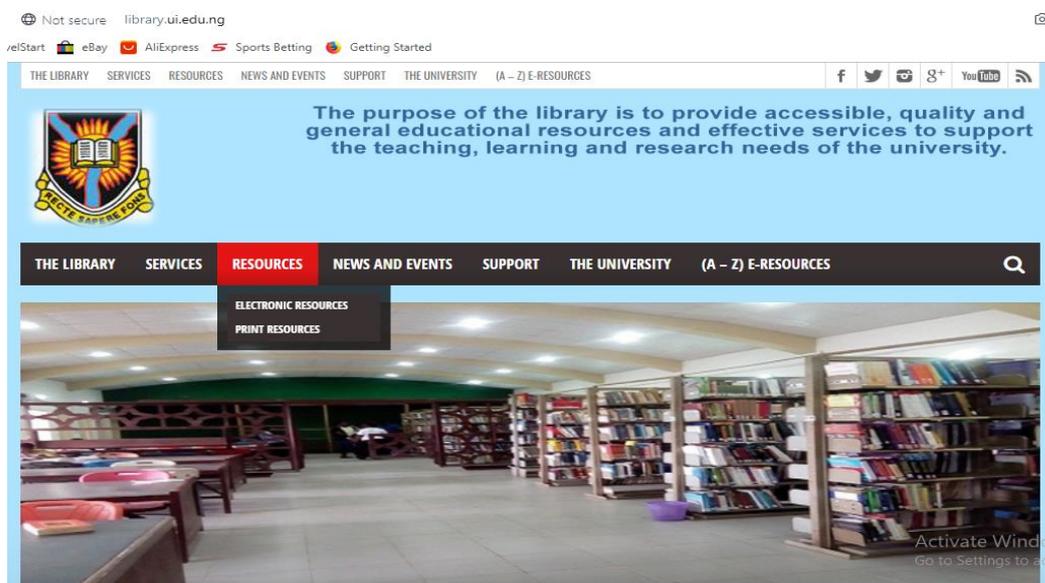


Figure 1: Screenshot of Kenneth Dike Library website home page

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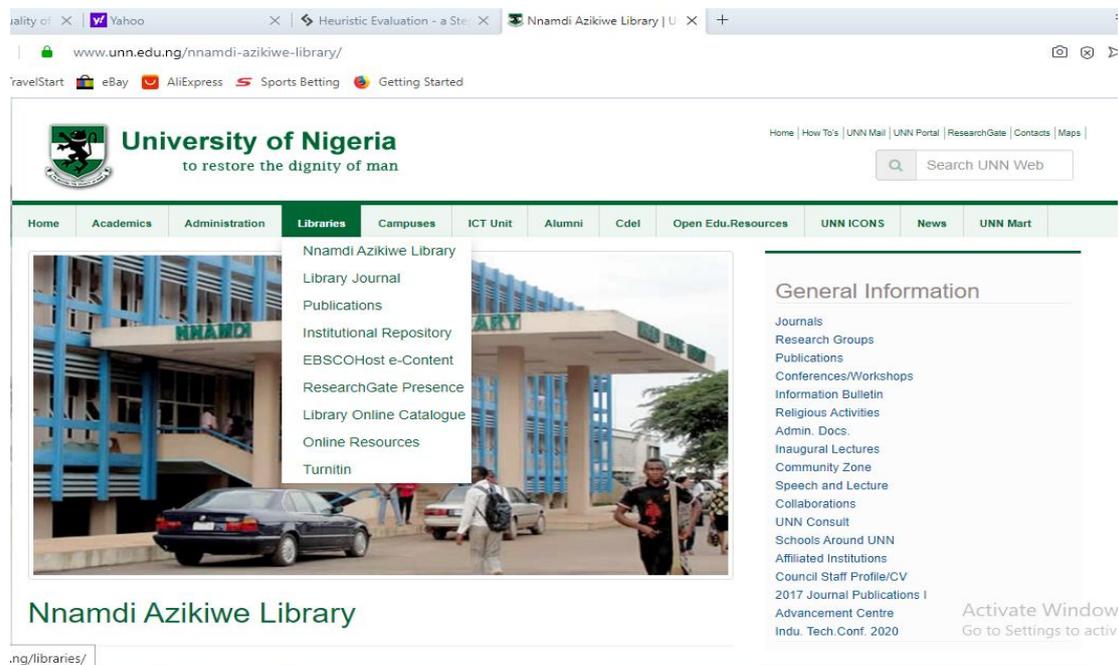


Figure 2: Screenshot of Nnamdi Azikiwe Library website home page

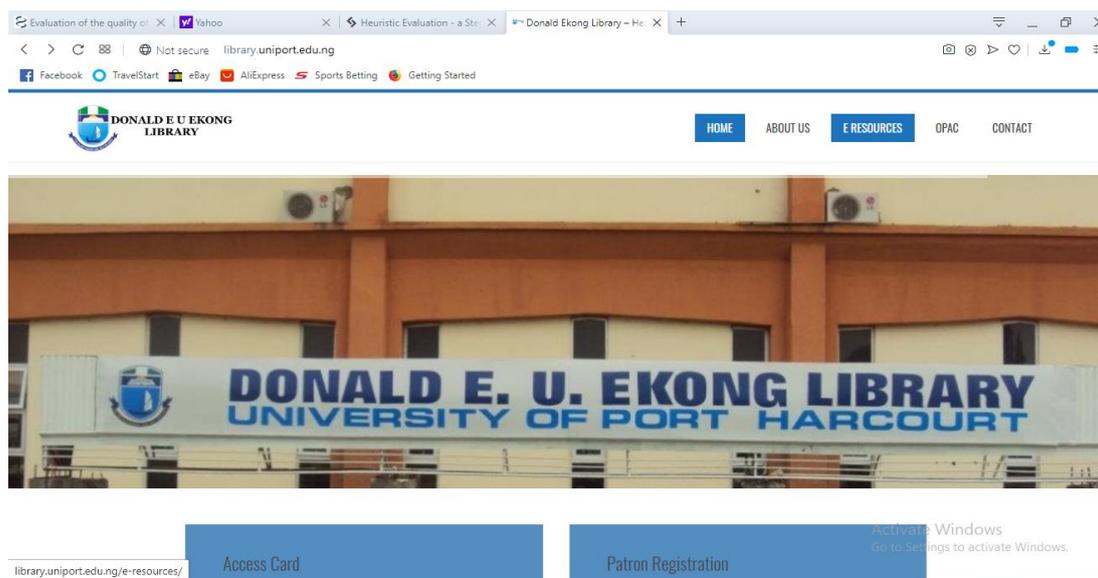


Figure 3: Screenshot of Donald Ekong Library website home page

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Appendix

Attachment of the Heuristic Evaluation Principles

Ten Usability Heuristics

by Jakob Nielsen

http://www.useit.com/papers/heuristic/heuristic_list.html

These are ten general principles for user interface design. They are called "heuristics" because they are more in the nature of rules of thumb than specific usability guidelines.

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1. Visibility of system status

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

2. Match between system and the real world

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

3. User control and freedom

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

4. Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

5. Error prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

6. Recognition rather than recall

Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

7. Flexibility and efficiency of use

Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

8. Aesthetic and minimalist design

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

9. Help users recognize, diagnose, and recover from errors

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

10. Help and documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

I originally developed the heuristics for **heuristic evaluation** in collaboration with Rolf Molich in 1990 [Molich and Nielsen 1990; Nielsen and Molich 1990]. I since refined the heuristics based on a factor analysis of 249 usability problems [Nielsen 1994a] to derive a set of heuristics with maximum explanatory power, resulting in this revised set of heuristics [Nielsen 1994b].

Updated Findings

I'll present my newest usability guidelines in the tutorial on **Fundamental Guidelines for Web Usability** at the **User Experience 2007 conference** in Las Vegas and Barcelona.

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See Also:

- Bruce "Tog" Tognazzini's list of **basic principles for interface design**. The list is slightly too long for heuristic evaluation but serves as a useful checklist.
- The 10 usability heuristics **applied to everyday life** (just for fun)

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