



Use of Web Analytics in Open and Distance Learning in the University of Ibadan. Nigeria

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Abstract

Internet provides Open and Distance Learners opportunities to connect with peers and tutors. It also provides access information and learning resources needed for effective learning experience and build skills necessary for 21st century workplace. How students/prospective students and others use and access information from institutions' website is important because it provides useful information on patterns of behavior needed for adaptive learning and the optimization of the website. The present study provides information about the online behaviour of Distance Learning Centre (DLC) students of the University of Ibadan over a period of five years, from *June 23, 2011 to June 22, 2016*. The findings indicate that users access the website more from the desktop computer than their mobile phone or tablets. Female users were more active on the website than their male counterpart and users between the ages of 25 to 34 were more active than users of any other age bracket.

Keywords: Open and Distance Learning, Internet, web analytics, Google Analytics, technology

Background

Education is a self-enlightening process that is crucial to the overall development of an individual and the society at large, hence, the need for educated one's to occupy the important positions in order to improve the society. According to Jimoh (2013), the provision of quality education to millions has been one of the challenges facing developing countries such as Nigeria. Experiences both nationally and internationally have shown that conventional education is extremely hard pressed to meet the demands of today's socio-educational milieu especially for developing countries. Thus, given that Open and Distance Learning education has, historically, been advanced as both a major means of upgrading the quality of education and succour for those who missed access to conventional schools in Nigeria, the revised National Policy on Education (FRN, 2004) details that the goal of distance learning education should be to:

1. provide access to quality education and equity in educational opportunities for those who otherwise would have been denied;
2. meet special needs of employers by mounting special certificate courses for their employees at their work place;
3. encourage internationalization especially of tertiary education curricula;
4. Ameliorate the effect of internal and external brain drain in tertiary institutions by utilizing Nigerian experts as teachers regardless of their locations or places of work.

Dhanarajan (2001) highlighted that distance education is a teaching and learning process in which students are separated from the teachers by a physical distance which is often bridged by communications technologies. Distance learning offers unique opportunities for: life-long learning to working adults; out of school programme for children and youth who are unable to attend ordinary schools, as a result of disability, illness or remote location; educational opportunities for nomadic and itinerant groups and pre-service teachers' preparation and in-service development, among others (UNESCO, 2002; Yusuf, 1999).

Brief history of Distance Learning Centre (DLC), University of Ibadan

The idea of distance learning studies in Nigeria was conceived by the Department of Adult Education of the University of Ibadan in 1972 in an attempt to meet the needs of the ever increasing applicants for University education. The proposal for the commencement of the various programmes was presented to the Senate of the University in 1976. Later, the National Universities Commission also gave its approval on the condition that it would be a self-financing programme. Hence, the present-day Distance Learning programme started first as External Degree before it was changed to External Studies programme of the Department of Adult Education in 1988 with courses from the parent department (Adult Education) and two other departments, Guidance and Counselling as well as Teacher Education.

By 1993, four more departments – Special Education, Library Science, Educational Management and Physical and Health Education had joined the three founding departments to offer courses leading to the award of the Bachelor of Education (B. Ed) degrees. Beyond the Faculty of Education, the programme was extended to the Faculty of Agriculture. In order to keep pace with global developments, the name of the Centre was changed from Centre for External Studies to Distance Learning Centre in 2002. Since inception, the Centre has turned out over 6, 000 graduates who are well placed in all facets of the society. Some of the graduates are now lecturers in higher

institutions while many are currently undertaking various postgraduate programmes both at the Masters' and doctoral degree levels.

The Distance Learning Centre's programme of studies is the same as that offered for full-time students of the University of Ibadan. The only difference is that it is designed primarily to suit those in the working class whose plans, distance, financial condition and other situations may not permit them to undergo full-time studies at the university. These students read their study-packs at their convenience, and consult with their course facilitators from time to time, and only come into residence six weeks in a year for revision and examination.

Currently, the Distance Learning Centre, University of Ibadan has mandated all her registered students to be computer literate in order to be well positioned to take full advantage of the support that information Technology offers to Distance Learners.

The Characteristics of ODL students

The confinement of instruction to the physical classroom setting is increasingly losing its monopoly with the advancement in technological innovation and invention across the globe. The introduction of web-based technologies into the classroom instructional delivery is rapidly expanding access to education for different categories of students, especially for this new generation of students who are technology-savvy. The internet creates unrestricted access to education through online learning, and many researchers and educators are interested in online learning to enhance and improve student learning outcomes while combating the reduction in resources, particularly in higher education. Online distance learning is one of the fastest growing trends in the use of technology to enhance instruction as it appropriately creates a comfortable platform for effective interaction between learners and teachers. This is well encapsulated in Dabbagh and Bannan-Ritland's (2005) submission that online learning provides an open and distributed learning platform that uses pedagogical and technological tools, supported by web-based technologies, to enhance co-construction of learning between students and instructors through meaningful interaction and collaboration. Online learning has become popular because of its potential in providing more flexible access to content and instruction at any time, from any place.

Further justifications for the increasing acceptance of online distance learning are the consistent explosion in students' enrolment, especially at the higher level of education, and their maturity to engage in learning through effective interaction (Adedoja, 2016). The use of online instructional tools can, to a large extent, reduce instructional challenges associated with the conventional mode of delivering lectures because it provides a forum to address issues through argumentative and collaborative discourse (Karacapilidis and Papadias, 2001). For students participating in online distance learning, the online environment is less intimidating as it allows for multiple and collaborative participation and less bounded or restricted by convention (Redmon and Burger, 2004).

Online distance learning (ODL) has become an effective platform for delivering distance education programmes in a number of post-secondary institutions in both developed and developing countries of the world. It is perhaps one of the hottest and most controversial developments in the education sector as it has both strong advocates and strong critics among scholars. However, the fact remains that online distance learning has effectively revolutionised instructional delivery by converging learners with diverse characteristics and abilities on a standard platform to interact and share opinions. Due to the nature of online instructional delivery,

it appeals to a variety of students with different capabilities and background: who work together as co-constructors of knowledge in teaching-learning process. There seems to be a huge pedagogical differences in face-to-face and online learning environments, particularly the rate of physical contact between students and instructors. Therefore, learners characteristics and their level of online interaction provide workable parameter to determine the success or otherwise of online mode of teaching (Adedoja, 2016). In online teaching, instructors need to be able to deduce students' needs through nonverbal cues since verbal communication and physical contact are practically unavailable. Therefore, an effective means of accomplishing this is to critically observe learners characteristics and background and also systematically examine changes in the level of students' interaction in online learning environment (Palloff and Pratt, 2003).

Institutions are making decisions to invest in online programmes despite many questions about the online learning environment (Virtual Schooling, 2002). Before making these decisions in response to economic pressure and learners' demands, institutions need to properly identify characteristics, skills, preferences and behaviours that enable students to be successful and active participants in an online learning environment. Wood (2005) submits that students who succeed in traditional settings may not necessarily perform well in online courses. This could be attributed to student motivation, self-discipline, or any of diverse learner characteristics that could predicate successful online instruction. Evaluating learner characteristics and how these features affect learners' participation and academic performance is one way to understand the factors promoting success in online learning environment.

Students register for online courses with certain learning experiences, learning styles, expectations, and needs that have to be addressed, and to which instructors need to be sensitive, to effectively maximize students' learning experiences. However, because of the unknown make-up of online students, the characteristics of the students may be unclear, making it difficult to develop effective online courses. With the increasing growth and popularity of online learning in academia, an all-inclusive research is needed to determine the commonalities and characteristics shared by learners who succeed more readily in online delivery formats. Hence, institutions and instructors are expected to properly analyse the fundamental characteristics of online learners in terms of demographic make-up, learning styles, preferences, technological skills and the nature of devices used to access online learning content. Understanding the role of student demographics in the online learning environment can assist institutions to make decisions regarding online programmes and packaging of instruction for online learners (Jozenia & Jane, 2010).

It should be noted that learners, using online delivery platform, need to possess some technological skills to become effective participants and co-constructors of knowledge in this virtual environment. Successful online students are expected to have access to necessary hardware and software, and to be minimally proficient in using the technology. Thus, there is a strong need for instructors to properly examine learners' technological skills in terms of devices used for instruction, the frequency of use of these tools, the selection of networks and other related issues. Effective online students should acquire online technological skills such as communicating skills, searching skills and engage in independent and collaborative learning with other members of the class. As such, online students need to possess basic proficiency in the use of technological devices and in the long run, they are likely to have higher technology skill levels than traditional classroom students (Watson & Gemin, 2008). It is expected that instructional methods and materials in online courses be designed and sequenced to suit students' unique developmental levels, capabilities and characteristics to engender effective participation of virtual learning activities.

Trends of technology in ODL, Nigeria

Distance education programs in particular are growing in importance as centers for the development of knowledge society, and this has led several countries to develop strategies to encourage this effort aimed at providing people who do not have the opportunities to attend conventional institutions of higher learning (Howell, Williams & Lindsay, 2003).

However, advances in technologies that provide a rich global resource and collaborative environment for dissemination of technology literacy materials, interactive discussions, research information, and international exchange of ideas, which are critical for advancing meaningful educational initiatives, training high skilled labour force, and understanding issues related to human development (Ifinedo, 2006). The use of technology in the 21st century is very crucial for effectiveness of ODL Institutions. The usage of the Internet to their advantage is also one of the key factors which determine the success of an institution. Today, technologies can help in quality assessment of the learners using online learner ratings and surveys. This helps not only generating the learner feedback but also in getting awareness about the changes in learning trends.

The rapid growth of online distance education worldwide has prompted the need to revise delivery structures and re-think pedagogical practices that were once appropriate. As new technologies emerge, instructional designers and educators have unique opportunities to foster interaction and collaboration among learners, thus creating a true learning community. The existence of ODL relies on the creation of learning communities, according to Palloff and Pratt (1999). Through technology, interaction and collaboration are now attainable in either asynchronous or synchronous learning networks. The emergence of social software, software that enables a group of individuals to collaborate via the Internet, has added a new dimension to online learning. The versatility of social software and other collaboration tools available today support constructivist environments that seek to motivate, cultivate, and meet the needs of the 21st-century learner.

Emerging technologies provide opportunities for instructor – student as well as student – student real time or time delayed collaboration in the first generation, Software companies are creating user friendly applications that are useful for educational purpose, such as Web tools, as many have called them, included email, chat rooms, and discussion boards, among others (Godwin-Jones, 2003). Nevertheless, in the second-generation technologies like m.learning, social networking or Web tools have taken learning interaction to the next level. Blogs (Weblogs), wikis, and podcasts (also called vlogs if they use video, or audio blogs if only audio is used) can be implemented alone or in conjunction with applications such as Imeem, Interactive Whiteboard, to create engaging learning environments. However, researcher suggested that these technologies, m.learning, social networking, blogs or Weblogs are best used as student portfolios that keep record of an individual's progress, accomplishments, as well as reflections in ODL (Weller, Pegler & Mason, 2005).

Teachers, as well as students in ODL, currently use the emerging technologies to boost the learning experience; some technologies are student controlled while others are instructor managed. Exciting examples of an instructor managed are Blogs and modules (Mejias, 2006). These technologies offers updates, information, and serves as a portal to student created blogs. Each student blog is a reflective piece, documenting the student's personal and intellectual growth throughout the course.

Furthermore, another trend of using technology in ODL is broadcasting of audio or video files over a podcast, this requires that users have a news aggregator installed; the news aggregator processes the RSS feeds and accesses the broadcasts on their devices. Really Simple Syndication (RSS) or Rich Site Summary, use XML (extensible mark-up language) to deliver audio files or keep track of Weblogs. Audio blogging, the earlier term for podcasting, coincided with the advent of the iPod, using MP3 audio files for learning delivery. Podcasting allow users to sign up for their favourite feeds and receive notification when a new one is available. The wide variety of skill using technology like podcasting may impact the way open and distance educators deliver instruction as well as the manner in which students are engaged in learning. The use of mobile technology is another dimension of using technology in ODL. Instead of the computer, mobile phone may be used for learning and, hence the term mLearning. So while traveling or waiting for something, students can use a mobile phone to connect to the Internet and continue learning (Charmonman & Chorpothong, 2005). Accessibility to communication between instructors and students is becoming much easier, cost of these communication is being reduced rapidly.

Web Analytics in Education

The teaching and learning process that is technology driven creates a dynamic environment where teachers can adequately engage and equip learners with skills needed to be competitive in the 21st century. However, Atkinson, (2010) cited by Ahalt & Fecho (2015), indicated that teachers and learners are disengaged from the learning process because learners are no longer satisfied with the way teachers teach and teachers are equally let down by the insufficient value placed on teaching, poor evidence/data-driven decisions, student's tracking and record keeping, among others. A new dimension to custom tracking, analysis of student's data and optimizing resources is call web analytics. Analytics is an important component of higher education as many institutions use it to improve strategic planning. Institutions have used analytics to improve resource utilization, identify existing data to improve retention, using notifications on user-identification personal devices to improve persistence and learning outcome. Part of the focus of analytics is to analyse students' success, website visits, predict web behavior, classroom use, retention, landing pages and others.

Bichsel (2012) defines analytics as the use of data, statistical analysis and explanatory and predictive models to gain insights and act on complex issues. It gives insight that prompt institutions to take action on diverse issues. Investing in analytics demonstrate how institution can sell itself to prospective students and also recruit staff.

In the same vein, an institution can make use of analytics to understand the demographics of students applying to institution and how resources can fully optimized. Web analytics has and would reshape how real-time data are accessed and used for both administrative and educational purpose because institution can reflect on what prospective students and/or parents really want from the institution's website. Joly, (2014) explains that the major finding from the web analysis of 12 colleges websites created analytics benchmarking which include; adaptability, Search Engine Optimization strategy, social media and paid search.

In this present study, the researchers explored how Google analytics can create a data bank that can help ODL institutions to improve learning of their students, to adapt the website to what users want, to know the number and type of audience that use the website and others.

Research Questions

1. How can Google analytics help to determine students' frequency of use In terms of demography of Students?
2. How can Google analytics help to determine students' frequency of use In terms of devices from which students access the internet?
3. How can Google analytics help to determine students' Interest in using the Internet?
4. How can Google analytics help to determine Browser and Operating System used by Students?

Methodology

Information for the study was obtained using Google Analytics. The data obtained was for a period of 5 years (*June 23, 2011 to June 22, 2016*) from the Distance Learning Centre (DLC) University of Ibadan, Nigeria (www.dlc.ui.edu.ng).

- The Browser and Operating System used by students to access the internet
- Demographics of students (age/gender)
- The device from which students access the internet, and
- The service provider/network used by students to access the internet

The report and tracking section on Google analytics include capabilities such as Audience, Acquisition, Behaviour and conversions. These allowed us to compare data with a prior period by month, year, week, etc. and generate report to know whether activity on the website is up or down by comparison to previous performance. Acquisition, where we obtain the information for the study from gives a micro level insights into the channels that funnel traffic to the website.

The Nature of Data/Findings and Discussion

Research Question one

How can Google analytics help to determine students' frequency of use In terms of demography of Students?

Owing to the learning environment of distance learners, they have peculiar information which can be used to better describe their learning process. Just like in traditional learning environment, where consideration is on how the facilities look like, how updated or otherwise they are, distance learners also have learning space which can better be described by the device they use to access their online interactions, post comments, share materials, download course materials, amongst others. More females (64.3%) than males (35.7%) participated in this study. Indeed those that fall within the 'screenagers' (those below 21 years of age) and nets generations (those below 34) were more involved in distance education (45%). Next is those that could be tagged as screenagers, which took 25% of the participants; 18% were 35-44 years of age; 10% were 45-54; 5% were within 55 and 64 years old; and only 1% is 65 years old or more. Evidently, it shows that the combination of net generation and screenagers were the most involved in the study. Though at initial, these categories were not those expected to participate in distance education. But because the design of distance education fits into the characteristics and practices of net generation, more of them seem more comfortable with this type of education. This should serve as pointer to what the present conventional higher education should consider in its overall operations.

Table 1: This shows the age and gender of students that accessed the website between June 23, 2011 to June 22, 2016

Research Question two

How can Google analytics help to determine students' frequency of use In terms of devices from which students access the internet?

Without doubt, there is a strong link between distance education and mobile learning. Distance education actually depends on the powers of mobile technologies, for effectiveness. Distance education will be highly restricted without leveraging on mobile technologies, not just any technology. It is important for distance education program to fully explore the affordances of mobile technology explosion in this 21st century. However, it may be costly to assume that in Nigeria, we are engaging mobile technologies the way we ought to. Social economic status, intrapersonal characteristics, amongst others, are potential factors that could restrain our distance education programme from achieving fully set goals and expectations. From this study, it is gathered that the devices with which online platforms were accessed are in three categories: desktop (49.99%), mobile (48.38%), and tablet (1.63%). From this result, it is very obvious that desktop and mobile devices are at par. The implication of this is that, the present distance learners are not fully mobile, in the context of mobile technology. It may be assumed that all distance learners have phone, but this may be far from reality. And if all have phone that is mobile learning compliant, it yet does not translate to usage. Distance learners may have mobile technologies at their disposal, but some intrapersonal characteristics may be responsible for their preference for technologies (such as desktop), that are not mobile. There may be need for online education providers to provide some training on how to use mobile technology for learning purpose. Most of them may use the same technology for social purposes, but not for learning.

Category	Sessions	% New Sessions	New Users
	4,895,344 % of Total: 100.00% (4,895,338)	25.06% Avg for View: 24.45% (2.48%)	1,226,689 % of Total: 102.48% (1,196,996)
Desktop	2,447,416 (49.99%)	30.52%	746,887 (60.89%)
Mobile	2,368,125 (48.38%)	19.39%	459,246 (37.44%)
Tablet	79,803 (1.63%)	25.76%	20,556 (1.68%)

Table 2: This table shows the devices from which the students accessed the website between June 23, 2011 to June 22, 2016

Research Question three

How can Google analytics help to determine students' Interest in using the Internet?

Assessing internet of distance learning students is important. First, to help course designers identify what students like to do, and to possibly adopt such information to re-design courses. In a student-centred online environment, identifying the interests of students helps to better manage course design. Second, it helps course designers obtain formative results, a kind of metadata about learners. Failure to recognize what other activities are of interest to online learners may create a wide gap between facilitators and learners. In this study, online students' interests have been categorized basically into two, namely affinity and in-market. While affinity category depicts internet use for social purposes, such as but not limited to, Movie Lovers (6.94%), Political Junkies (6.94%), TV lovers (6.76%), News Junkies and Avid Readers/Entertainment and Celebrity News Junkies (6.19%), Sports Fans/Soccer Fans (6.07%), Social Media Enthusiasts (4.84%), Music Lovers/World Music Fans (4.13%), Shutterbugs (4.10%), and Mobile Enthusiasts (4.01%). In-market category considers Post-Secondary Education (13.03%), Employment (9.30%), Dating Services (7.45%), Test Preparation and Tutoring (5.85%), Employment/Career Consulting Services (2.62%), Consumer Electronics/Mobile Phones (2.56%), Autos and Vehicles/Motor

Vehicles/Motor Vehicles (4.46%), Gifts and Occasions/Wedding Planning (1.74%), Telecom/Mobile Phone Service Providers (1.65%), and Apparel and Accessories (1.59%). Though there are overlaps and connection among the sub-categories, it becomes clearer that the present online users have more interests in post-secondary education, employment, dating services, test preparation and tutoring. Also, some of them are movie/TV lovers, love to read news about politics, entertainment, celebrities, and sports. Teaming all these sub-categories together, from both in-market and categories, suggests a lot about today’s online learners. Engaging our learners with video-based instructions that relate to current happenings around and in the world, and allowing learners to share thoughts and ideas are considerations that higher education institutions should harness into designing instructions.

Table 3 and 4: These tables indicate the interest of users that access the website between June 23, 2011 to June 22, 2016

Research Question Four

How can Google analytics help to determine Browser and Operating System used by Students?

Browser	Sessions	% New Sessions	New Users
	4,895,338 % of Total: 100,000% (4, 895,338)	24.50% Avg for View: 24.45% (0.21%)	1,199,517 % of Total: 100.21% (1,196,996)
Opera Mini	2,171,919 (44.37%)	16.69%	362,447 (30.22%)
Firefox	1,002,185 (20.47%)	36.91%	369,915 (30.84%)
Chrome	480,495 (9.82%)	20.47%	98,374 (8.20%)
Internet Explorer	322,912 (6.60%)	33.72%	108,895 (9.08%)
Blackberry	193,431 (3.95%)	19.07%	36,894 (3.08%)
S40 Ovi Browser	158,752 (3.24%)	39.20%	62,228 (5.19%)
Safari	129,806 (2.65%)	30.55%	39,650 (3.31%)
UC Browser	116,362 (2.65%)	28.36%	32,995 (2.75%)
Android Browser	90,965 (1.86%)	22.77%	20,714 (1.73%)
Mozilla Compatible Agent	79,154 (1.62%)	38.19%	30,228 (2.52%)

Table 4: This shows the browser or the Operating System used by students to access the website between June 23, 2011 to June 22, 2016

A range of factors determine effective and functional learning environments. If one of the factors is dysfunctional, it has high potency to reduce effectiveness of learning environment. In distance education, factors such as software, hardware, and *peopeware* constitute its learning environment, thus must be synergized to achieve expected goals.

First, the browsers and operating systems with which distance learners access their platforms need to be explored. Browsers do not perform the same way. Browsers determine how optimized online

environments would appear. A number of browsers exist. But in this study, some browsers are more frequently used than others. Some of most frequently used ones are Opera Mini (44.37%), Firefox (20.47%), Chrome (9.82%), and Internet Explorer (6.60%). Others are, BlackBerry (3.95%), S40 Ovi Browser (3.24%), Safari (2.65%), UC Browser (2.38%), and Android Browser (1.86%). Amongst others, Opera Mini and Firefox have the highest usage frequency. These results could mean that: first, the online environment(s) used for students in this study is/are more optimized on these browsers, than on others. Another implication of this result is that some browsers have characteristics that make them widely accepted and being regularly used. Technology Acceptance Model by Davis (1995) could explain this occurrence. Hinging on this model to explain the usage frequency of the browsers, suggests that distance learners found Opera Mini and Firefox easy to use and helps to engage in online tasks more smoothly than it was for other browsers. The implication of this to online education providers is that, the functionalities of designed platforms should be cross-checked across browsers, and findings should be communicated to learners. This is very important to ensure that students are not left to use whatever browser they have, which may eventually frustrate them, and impede learning.

Conclusion

The findings from the study show that the technology/technology usage/ digital divide between girls and boys, men and women as been erased. More females access the internet to obtain valuable about their courses, general information and so on. Worthy of note is that young people between the ages of 21-34 have more devices and access to the internet than any other age category. Also, DLC students used more Desktop/laptop (PC) and mobile phones to access the internet, this underscores the popularity of these devices among students.

Lastly, Opera Mini and Firefox browsers appear to top the list of browsers students find easy to use especially to surf the internet.

Recommendation

The implication of these findings to practice include:

Educational institutions should invest in big data and analytics to know how to create or develop electronic platforms that would suit students' technology preference and type of devices or operating system they possess. Lessons and course materials should be syndicated on both desktop and mobile devices because many students possess or access to these to devices.

There is no doubt that today's workplace requires that individuals create and collaborate within the constraints of time and place. These needs have given way to technological advancements that allow for real-time communication among peers and co-workers who stay connected over the Internet. It is no coincidence that these same advancements bring a fresh promise to open and distance education. To fulfil the learners' desires to continue their education lifelong one must provide the necessary quality education and inputs through Open and Distance Education Course for sharing educational information and exchanging educational services worldwide through Information and Communication Technologies in a changing global development. Web analytics can help institutions especially in sub-Saharan Africa to access to real-time and authentic data useful to improve the standard of the institution and the services they provide to students and prospective students.

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