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Mobile Device Compliant E-Brochure Application

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Abstract: ***The mobile era is here and today, the number of mobile users is greater than the number of desktop users. Except for Mobile website, Web Browser view presentation of PDF Brochures sizes does not comply nor preserve the standard size of an average Brochure. Brochures are standard Documents with concise features that enhance its divulgement and visuality. This standard is gradually fading away with the advent "Web browsers enhanced PDF Brochures". This work however focuses on using the numerous benefits associated with the screen size and Technology of Mobile Phones in preserving Brochures' basic standards in the development of Mobile Electronic Brochure (E-Brochure) App. An APP usually refers to a software application or programme. Apart from Cost Effectiveness, the major Electronic Brochure benefits includes, free unlimited distribution, excellent cost savings, quick download and sharing, easy updates, retains the look and feel of traditional brochure, higher quality, more interactive and easy access.***

Keywords: E-Brochure, Mobile App, Mobile Phone, JAMB, Django

1. Introduction

A brochure or pamphlet is a single sheet document, often folded into thirds, that is mass-produced to provide information to the public. Brochures have a single focus that may include information about an event or organization, sell a product, or solicit support for a point of view or course of action. Brochure is used in several fields such as education, health, sports, entertainment etc. This is to guide the intended audience of the book in decision making process. Times are changing, technology is evolving, despite the advent of digital computers and web Technology, most websites are still static PDFs Brochure inclined, with hyperlinks feature to joggle to among PDF web pages, though we've reached a new decade in Technology.

In 2013, Joint Admission Matriculation Board (JAMB) introduced Electronic brochure (E-brochure) or PDF Brochure, which was given to candidates in a Compact Disk (CD). Despite several advantages of using the PDF based brochure, a lot of candidates were unable to access it as most of the candidates do not have computer devices that can open the CD. JAMB created a Portable Document Format (PDF) version of the brochure in 2017 and made it available on JAMB website, jamb.gov.ng different from the more popular jamb.org.ng website. It's more surprising to know that it the first and current PDF version of the Brochure. Candidates have been subjected to non-interactive usage of this version. Moreover, it doesn't engage readers as much due to its simplistic and rigid presentation which is more like the electronic version of the traditional paper brochure, with a lot of time spent joggling on the diffused for most relevant information.

With the increasing number of candidates seeking admission into various higher institutions, there's need to simplify the admission process by making it more efficient. The generality format of existing JAMB E-brochure makes it difficult to find complete relevant information and even in record time, due to network issues among others. With large volume of irrelevant information to scan through, comprehending the content is mirage. It also lacks some important information like JAMB and Post-UTME cut-off marks. It's however necessary to find an effective means of communicating a university whole requirements to candidates in an efficient and compact manner, within the shortest time frame.

Except for Mobile website, Web Browser view presentation of PDF Brochures sizes does not comply nor preserve the standard size of an average Brochure. Brochures are standard Documents with concise features that enhance its divulgement and visuality. This standard is gradually fading away with the advent "Web browsers enhanced PDF Brochures". The way the information is presented helps determine how useful a brochure will be to a reader [2]. Moreover, the brochure fold affects the way the information is laid out and can have a significant impact on the brochure's design [4]. A typical brochure consists of a single 8.5 x 11-inch sheet of paper that is folded into two or three sections. That means that each side of a tri-fold brochure that is printed on standard letter size 8.5" x 11" paper will measure 5.5" x 8.5" and 5" x 3.69" respectively [3] as shown in Figure 1. The latter is a simple, tasteful folding style for practically any application. Making a brochure longer is not always a good idea as people often prefer brief information and may not be motivated to read something lengthy similar to Desktop browser presentation [5].

The mobile era is here and today, the number of mobile users is greater than the number of desktop users. Research has shown that 77% of mobile searches happen at work or home where desktop computers are likely to be available [7]. In addition to numerous benefits associated with Mobile Devices usage, The Screen size could also be of a great advantage in relative to the preservation of Brochure standards in electronic format.

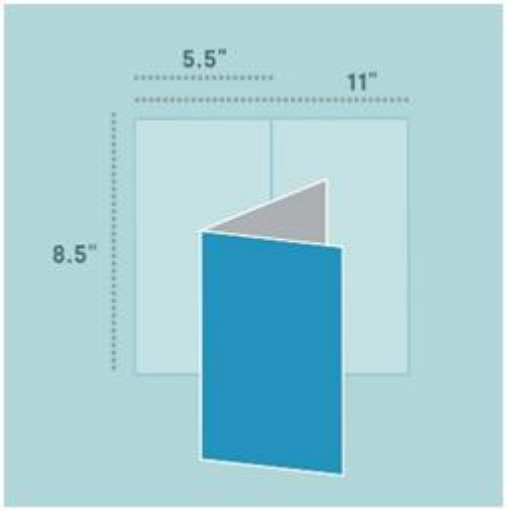

Figure 1 (a): Half-fold brochure Standard size

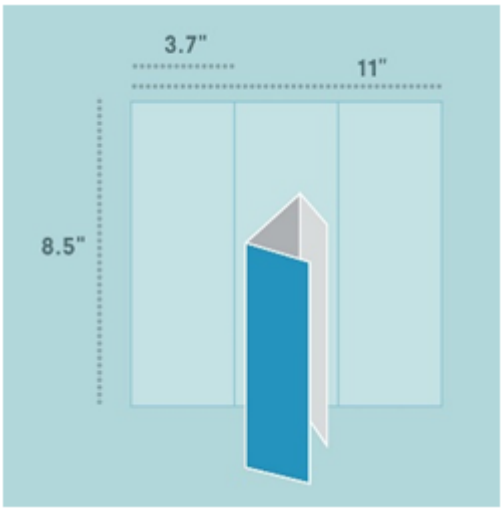

Figure 1 (b): Tri-fold brochure Standard size

This work however focuses on using the numerous benefits associated with the screen size and Technology of Mobile Phones in preserving Brochures' basic standards in the development of Mobile Electronic Brochure (E-Brochure) App. An APP usually refers to a software application or programme. The use of electronic brochure (E-brochure) over PDF-based brochure cannot be over-emphasized, apart from Cost Effectiveness, the major benefits includes, free unlimited distribution, excellent cost savings, quick download and sharing, easy updates, retains the look and feel of traditional brochure, higher quality, more interactive and easy access.

The mobile user interface (mobile UI), which is the graphical and usually touch-sensitive display on a mobile device, such as a smart phone or tablet allows the user to interact with the device's apps, features, content and functions. Mobile user interface (UI) design requirements are significantly different from those for desktop computers. The smaller screen size and touch screen controls create special considerations in UI design to ensure usability, readability and consistency [10]. These features are basically related to feature standards Brochure folded designs. A mobile phone Screen size, simply the physical size and measurement of the screen, has larger screen size of 6.5-inches or above, even up to 7.5" by 4" retina display [8] as shown in Figure 2. This ranges are close to the folded standard sizes of Brochure, enough to preserve the concise informative presentation standard.

Figure 2: Phone Sizes. (SOURCE: SAMSUNG)

Mobile apps, designed for use on smartphones, tablets, and other smaller touch devices have the advantage of utilizing features of a mobile device like a camera, contact list, GPS, phone calls, accelerometer, compass, etc. Such device features, when used within an app, can make the user experience interactive and fun. Moreover, these features can also reduce the efforts users would have to make otherwise. For instance, users completing a form on a banking app might need to fill a form and submit their photographs to complete the process. The app can enable users to use their mobile camera to capture and submit photographs. The interrelated features significantly shorten the time taken to perform a particular task in an app and boost conversions. Mobile websites can also use some mobile features like the camera, GPS, etc. Still, there are technological constraints and privacy concerns in utilizing multimedia features of a device (which mobile apps can use).

2. Literature Review

A brochure is a written document that gives information about an organisation, company, products, and services to prospective customers, clients or their staffs Brochure was used as far back as 1940s to advertise Arizona limited who offers transportation services via railway [13]. Brochures available in electronic format are called e-brochures. This format has the added benefit of unlimited distribution, cost saving and easily Updated among others, when compared to traditional paper brochures [14]. Web apps or applications run in a web browser, available online and can be used on multiple devices. A mobile app is an app that only works on a mobile device [9]. They are actual applications that are downloaded and installed on mobile device, rather than being rendered within a browser. The app may pull content and data from the Internet, in similar fashion to a website, or it may download the content so that it can be accessed without an Internet connection. This ability of Keeping the relevant data within the device both online and offline modes efficiently makes mobile apps stand out [12].

Around 50% of internet traffic occurs through mobile phones. Mobile apps are designed for use on smartphones, tablets, and other smaller touch devices. One typically go through a store like Google Play (Android), Windows Store (Windows), or Apple (iOS) to install a mobile app. They provide users with functionality similar to what is received while browsing a web app from a desktop computer [9]. According to Gartner Inc. (2011), recent search markets highlighted that worldwide mobile application store downloads had reached 17.7 billion downloads in 2011, which is a 117 percent increase from an estimated 8.2billion downloads in 2010. This exponential growth of mobile apps download highlights the importance towards designing and developing mobile apps in the current mobile development industry landscape [11].

Ladoke Akintola University of Technology, LAUTECH, the case study of this research was established in the year 1990 with the aim of conducting researching offering courses in the fields of science and technology. The institution offers 33 courses across seven faculties as at the time of conducting this research. The faculties include Faculty of Engineering and technology, Faculty of Pure and Applied Sciences, Faculty of Management Sciences, Faculty of Pure and Applied Sciences, Faculty of Environmental Sciences, Faculty of Agricultural Sciences, Faculty of Basic Medical Sciences and College of Health Sciences.

Joint Admissions & Matriculation Board, JAMB Brochure or E-brochure shows a list of courses offered in various institutions, their JAMB subject combination, as well as O' level and Direct Entry requirements for entry into those courses. The JAMB brochure is available for various faculties across all institutions in Nigeria. It also consists of JAMB subject combination and requirements for UTME, O' level or Direct entry for [15]. PDF stands for "Portable Document Format". Originally created by Adobe, this format is created to display 'Read-Only' documents that can be accessed on devices such as PCs, laptops, tablets and mobiles. PDFs can now be viewed by most web browsers, without the need to have a PDF viewer installed on the devices. Although there are some note-worthy benefits of using PDF files, there are also some grave disadvantages of using this type of format. Which includes high cost of editing, rigid and inflexible format [2].

There are lots of standard brochure dimensions. A brochure has folds and the fold is key. There are lots of different ways to fold a brochure, and the best fold choice depends on the brochure's size and its design. Commonly used brochure fold types include: Trifold, Half-fold, Gate fold, Double gate fold Parallel fold, Z-fold, Accordion fold, Roll fold and more. The most common styles of brochures are letter-size half-fold and tri-fold. A Twofold single 8.5" x 11" folded into two is a memo sized Brochure of. As the most common brochure size, the tri-fold is ideal for general use [3]. Screen size measurements for smartphones are calculated by measuring diagonally from the upper left-hand corner of the screen to the lower right-hand corner[1]. These measurements are expressed in inches. Larger screen phones are typically said to be 6.5-inches or above [8].

This work employs Mobile app technologies in increasing the availability and accessibility of admission information to students. This makes it more comprehensible and faster relative to scanning through bulky book or browsing through the existing PDF brochure. One major disadvantage of the existing E-brochure is its non-instructiveness and inflexible accessibility format. With use of this Mobile app, JAMB candidates will have easy and immediate access to the application, more interactively like the social media.

3. Design Architecture

This involves the design of the Mobile Device Compliant E-Brochure Application and how the application will be used. The requirements of the design brings together all the admission requirements of all the department in Ladoke Akintola University of Technology, Ogbomoso unifying them on an integrated system of mobile application where users can seamlessly access it worldwide and have comprehensive information of the admission requirement of various course of study. This information can also be easily shared among users as opposed to a physical brochure. Our architectural design of the developed system includes three major components including the Web Ontology Language/Resource Description Framework (RDF) that gives a high-level implementation of ontology concepts and Django mobile application for querying the model and providing the mobile application with a RESTful API (Representational State Transfer, Application Programming Interface). Figure 3 shows the interaction between the various components in the system.

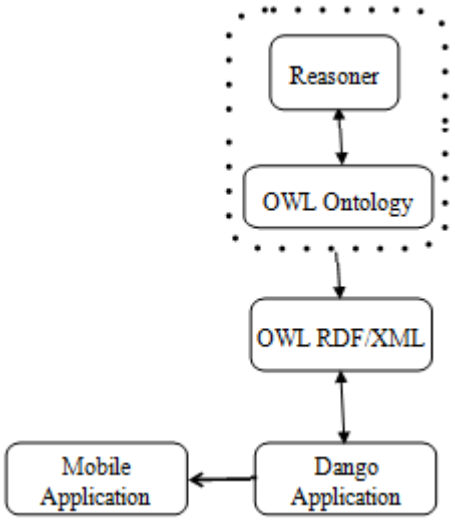

Figure 3: Interaction between the various components in the system.

a) Integration of RDF with Django

In this work, RDFLIB in Django interacts with the RDF format of designed ontological model. The ontograph is as shown in Figure 4. Protégé, an ontology editing tool is used develop the E-Brochure ontology, this serves as the data repository for the application. As there are no previously related ontologies on E-Brochure is available from third party for re-use in this work, the E-Brochure ontology developed from scratch.

All Information about Schools, Courses and Requirements are established as concepts/classes, properties/relations and individuals/instances in the E-brochure Ontology. The ontology is coded in web ontology Language using protégé ontology editor. Figure 4 depicts the Class Hierarchy. The Class "E-Brochure" includes several OWL individual like FMGS, FES, FET, FAG, FBBM, FCS, Medical Laboratory Sciences and so on. Figure 4 shows the ontograph display of graphical relationship between concepts in the ontology

Integration of Protégé with Django

The OWL RDF/API Resource Description Framework gives a high-level implementation of ontology concepts for integration into web accessible format. Django RDFLIB libraries, for interacting with the RDF (Resource Description Framework) files produced are used to interact with the Ontological Model, ontology graph, shown in Figure 4.

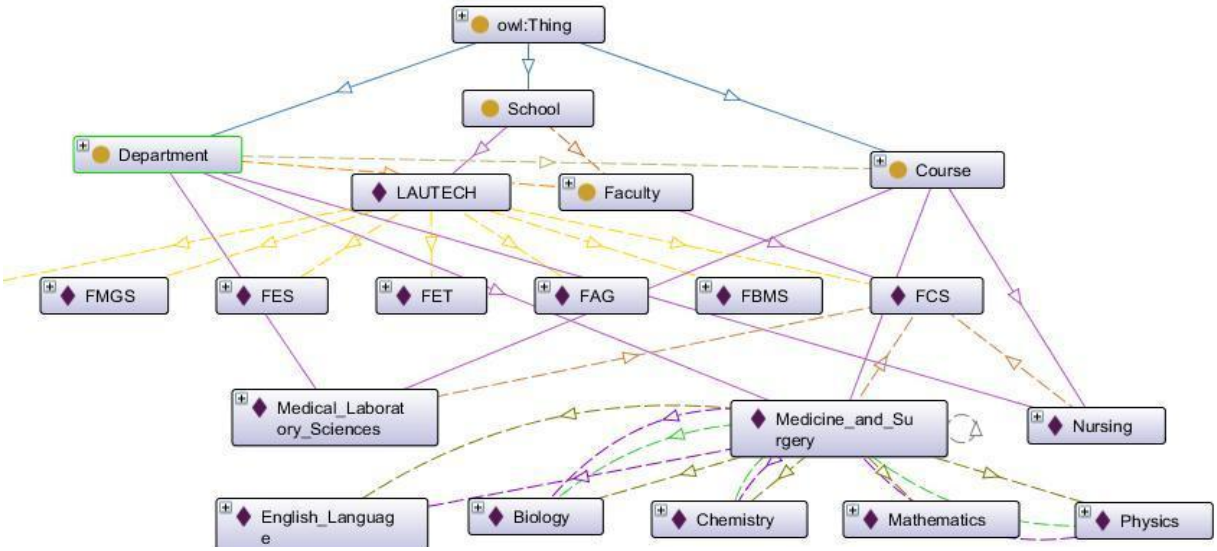

Figure 4: LAUTECH E-Brochure Ontograph Section

b) Mobile Application Integration

The mobile application interacts with the Django web application through a RESTful API (Representational State Transfer Application Programming Interface). This uses HTTP (Hypertext Transfer Protocol) to send JSON (Javascript Object Notation) which can be interpreted by any modern language. The Django application is hosted on Heroku for round the clock and worldwide availability. The application is composed of models matching the classes, object properties and data properties of the E-Brochure ontological models to temporarily store the data from the API during runtime. The interface design. The interface design captures the developed ontology to access the knowledge represented in it. The application is composed of the Home page, Department Details Page and Search Interface, Part-time Page, Open and Distance Learning Page, Figure 5 shows the Home Page interface ofthe web application developed.

c) Mobile Application Development

The mobile application is developed using Flutter Framework. The Flutter framework is a dart framework developed by Google Incorporations for building cross platform applications. The only limitation is that a MAC OS is required to build the iOS application package. The dart HTTP library is used to access the REST API. The application is composed models matching the classes, object properties and data properties of the ontological models to temporarily store the data from the API during runtime. The application is also composed of the interfaces, including Home page, Part-time Page, Open and Distance Learning

Page, Department Details Page, Search Interface. The details of these pages are presented in subsequent section.

The Home Page page shows the list of all the departments in with the courses they offer. An icon related to the department is placed beside the department for a better visual representation of what the department offers, as shown in Figure 5. It shows the list of all the departments in with the courses they offer. An icon related to the department is placed beside the department for a better visual representation of what the department offers. Figure 6 depicts the Full time Programme Page, which shows the required UTME Score, Courses O9ffered, Post UTME Score and so on.

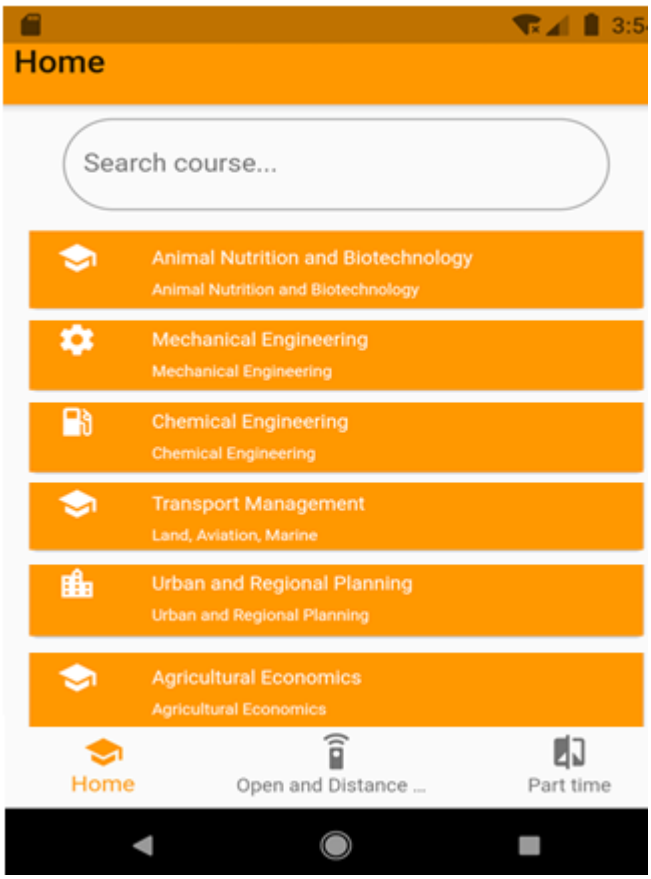

Figure 5: Home Page interface

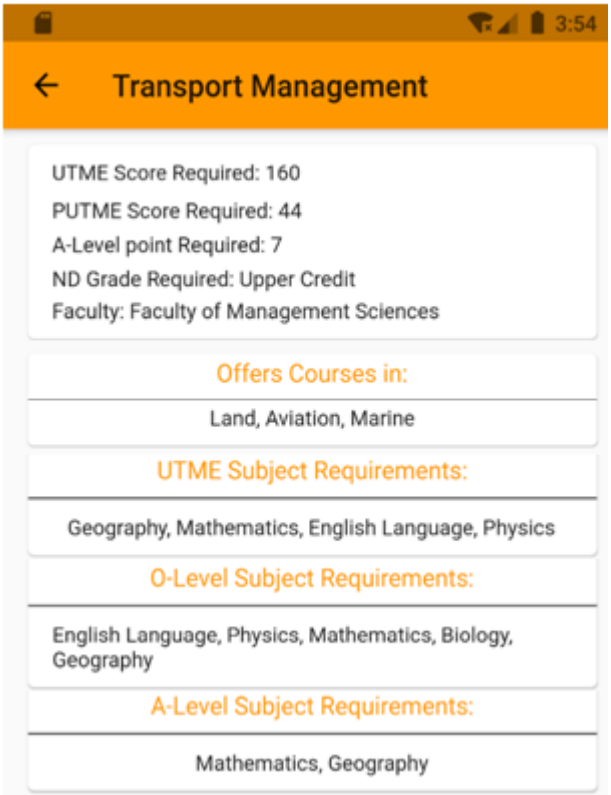

Figure 6: Full time Programme Page interface

4. Conclusion

This work has presented an integral part of enhanced version of the existing JAMB E-brochure by developing an ontology driven Web/Mobile Application which is more interactive with concise, precise and accurate result. This provides an effective means deriving required admission information for desired programmes by prospective candidates.

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