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'Jobs256' Mobile App Linking Job Seekers to Job Opportunities

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Abstract: There is a challenge of unemployment among the youth in Uganda today. Many University graduates fail to get jobs because the job market seems saturated since the available jobs cannot be found. The study therefore aimed at linking the job seekers and available jobs. To achieve this aim we developed a mobile app that aggregates existing job postings from web portals to improve accessibility, timeliness and efficiency. Agile methodologies particularly Scrum and eXtreme Programming were used to develop the mobile application (app). Results showed the app is not only saving employers monetary resources but provides a sustainable and practical way to link Job seekers and to available job vacancies.

Keywords: Mobile Applications, Jobs, Jobseekers, Employers, Agile Development, Case Study

1. Introduction

1.1 Background to Job Environment

The adoption of Information and Communication Technology (ICT) is believed to make life easy by solving society problems using technology. ICT facilitates social change and development in the areas of education, health, governance, youth and community development. ICT offers a channel for information distribution in real time depending on the media used. Technology has provided effective means of communication, collaboration and interaction regardless of location. The use of mobile phones has increased over the years with youth being the majority of users, since they are an integral part in their lives. There is an increase in the production and use of smartphones which afford downloading applications (apps) to accomplish several tasks.

1.2 Problem Definition

According to a national statistical abstract by [7], youth between the ages of 18 and 30 constituted the majority of unemployed population by early 2011/12. National youth unemployment stood at 19.7% with a total of 6.3 million youths in Uganda, out of whom females constituted 51% of the youth labour force. The capital city Kampala where this study's case was carried out had a youth unemployment rate that was 3 times the national youth unemployment rate [7].

A review of literature revealed that there is paucity of research on linking job seekers and employers. There are formal and non-formal methods of searching for jobs. Informal methods include contacts from friends and family, whereas the formal methods include responding to newspaper ads and web portals. The latter were the prime means of accessing job openings in Uganda. The job market seems saturated due to inaccessible information on available jobs which makes life hard for graduates. Getting a job today has become an uphill task; not to mention the low wages in most of the places of employment. This means

that the employed are also constantly looking for greener pastures; new employment, which makes finding jobs even more difficult. On top of this, some prospective employers rarely advertise in newspapers due to the cost of publishing an advert. The newspaper coverage is limited to urban areas therefore the 80% statistic of unemployed youth requires us to develop new ways of dissemination of information about available jobs. ICT provides a good platform to solve this dilemma. Therefore, this study sought to address the existing gap between the available employment vacancies and a cosmic number of job seekers. The objective, methodology, technology description, results, business benefits and conclusion are discussed in the next sections.

2. Objectives

The study was guided by a major objective of harnessing the information gap between job seekers and available job opportunities. We aimed at bridging an information gap specifically focusing on fostering jobseekers' ability to make informed decisions and comparisons by linking job seekers and available jobs. Significant focus was on incorporating innovative technologies like real time push notifications and locating jobs using geolocation coordinates. These two technologies leverage timing and job suitability respectively, two factors that prominently influence people's decisions when seeking for employment. The end result was an android mobile app on the google play store to achieve the objective. This research is intended to help future and current practitioners in the same or related field of using ICT by pinpointing out strategic interventions that are crucial to understanding varying contexts of end users of such technologies.

3. Methodology

A Single-Case design was carried out using a case study methodology and Agile Development was employed as a domain specific method to realize the mobile app. The choice for the methodology was primarily based on the need to emphasize a detailed contextual analysis of different factors and how they relate to job seeking and the need to identify a causal link between the use of mobile phones and access to job advertisements to a largely unemployed Ugandan youth population. Once the mobile app was ready for deployment, the researchers carried a more passive role predominantly through observation due to the realistic nature of the problem under investigation and therefore qualitative data like users' opinions, Google Play store ratings, reviews and comments were prioritized over statistical data. Complimentary data was collected through observations and heuristic evaluations.

Figure 1 presents a pictorial representation of the research design. The study kicked off with a planning Phase where the objectives and aims of the study were stipulated. This was followed by a design phase where significant variables like Timeliness and Accessibility to the study were scrutinized. The Preparation stage involved building and testing data collection instruments and checking them for validity. Statistical data was collected over a period of 12 months and learning outcomes communicated in the next section. We collected data relating to Daily Installs by device, Daily uninstalls by device, Cumulative average ratings over a period of 1 year which were subjected to linear regression analysis using Tableau with variables of time and job suitability as predictors which were readily available from the developers' console and dashboard of the Google play store.

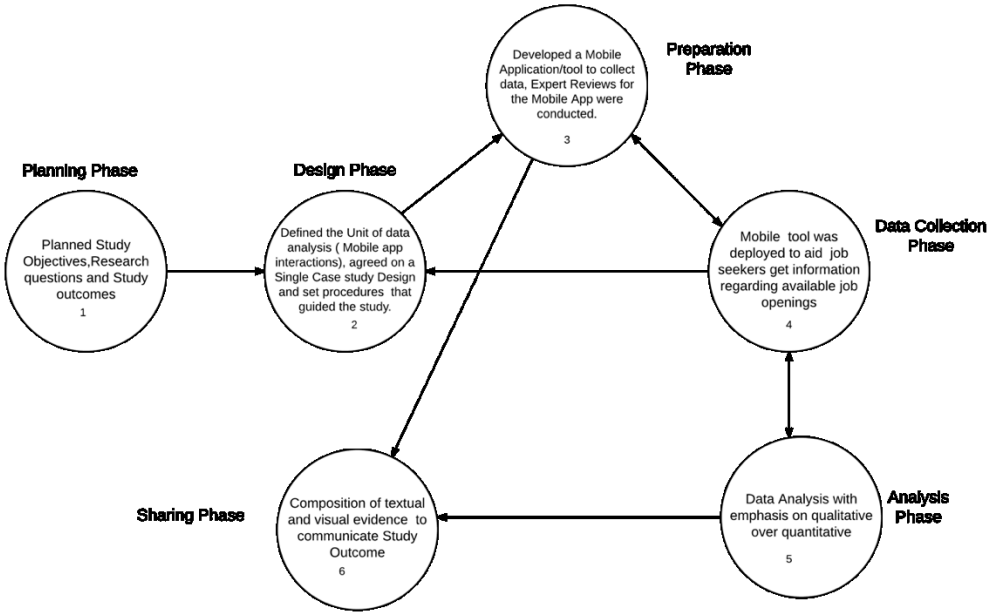

Figure 1: Phases that guided the Case Study as adopted from Yin (2014)

4. Technology Description

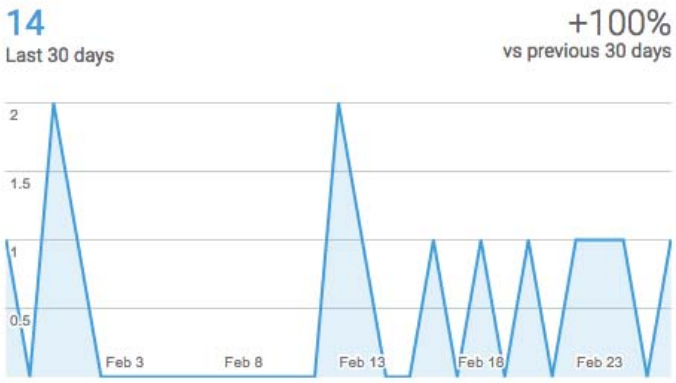

Figure 2: A graph showing user acquisition as of February 2016

Deeper Benchmarking of existing related systems specifically those of leading job brokers i.e. Brighter Monday and NFT Consults showed that Jobs information is designed in a "one size fit for all". Given that Job seekers vary in qualification and capability, there was need to pay extra attention to innovative technologies that would influence user contextualisation while providing functional concurrency to all users at the same time. System review of currently used systems does not provide strategic interventions to timeliness, user contextualisation and availability. Google Cloud Messaging was best suited to provide timeliness, Geolocation and bookmarking features to enable user contextualisation and offline functionality to ensure availability of information across regions with poor network connectivity. Application development started in February 2015 and development was in 5 Monthly iterations making the app ready for end users by June 2 2015 on the Google Play Store which is available to date.

The mobile app was realised using Ionic Framework. Ionic is a new Standard Development Kit (SDK) [9] technology in mobile app development industry predominately made of Hypertext Markup Language (HTML) 5 and Angular JavaScript (JS) [6]. The combination of these is complimented by Cascading Style Sheets (CSS) that help to deliver

lightweight and very powerful mobile apps with native features [8]. A couple of Apache Cordova Phone Gap plugins were married into the application to enable the development of crucial functional requirements of the applications. The use of such programming technologies makes the possibility of having a cross platform application possible with minimal variations.

The app was designed to crawl preprogramed online job boards and top employers' websites in Uganda. The crawl engine reads the content of each site's Really Simple Syndication (RSS) file and then synthesizes them to get related information which is aggregated, categorised and delivered to the application users. Through Google Cloud Messaging Service [4], users who subscribe to particular job categories are notified at a desired time through push notifications. Angular JS helps to deliver the framework for the application to deliver dynamic content in real-time using declaration braces. The development process was guided by agile development principles particularly those of scrum and XP [3] which informed the development team of necessary changes through user feedback [5].

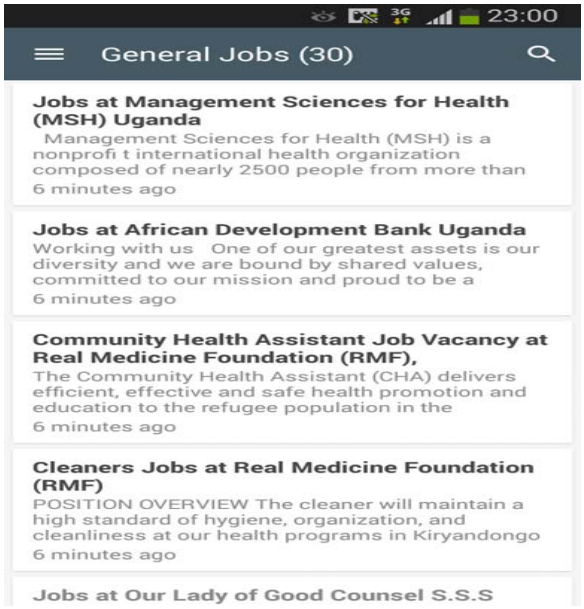

Figure 3: Screenshot showing the backstage of the Application with categorised and aggregated job listings

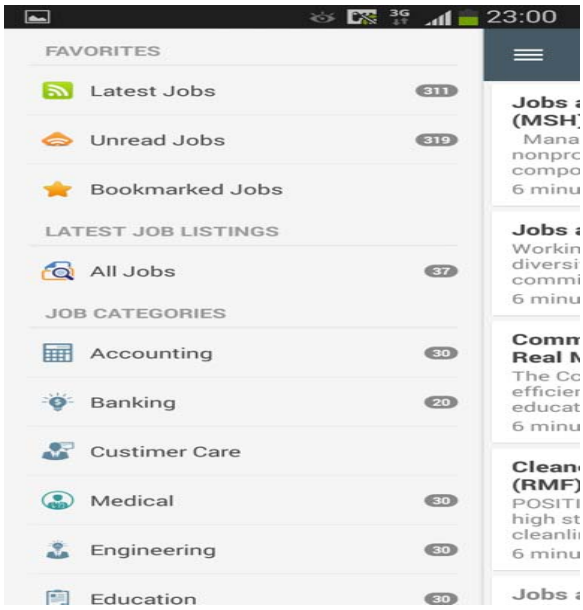

Figure 4: Screenshot showing a looped HTML5 list element to display available jobs

The methodology principles dictated that monthly iterations of the application had to be developed to address user comments and reviews that were left at the play store and through the support email address. A daily burn down chart guided the achievement of different tasks and milestones. The chart was used to balance the workload with time left during the development period. The app User Interface (UI) is rendered by Angular JS after it has been initialized. Each element on the initialized screen with ng-app directive is compiled.

Using an online API builder (swagger.io), an eXtensible Markup Language (XML) driven Application Programmer Interface (API) [2] service was built to fetch and sync Jobs information from the different Job Portals and top employers. This information was later converted to JSON and populated in hard coded Angular scope modals. Using angular directives which are present day HTML 5 attributes, data is bound onto a HTML list element which is given a looping feature to produce as many job listings as those passed on by the API service. It is equally crucial to understand that the mobile application has

integrated 3rd party plugins from Apache Cordova formally known as Phone Gap. Specifically, cordova-plugin-network-information helps to switch the application between offline and online modes, cordova-plugin-file-transfer helps to pull attachments like photos and other rich media that might be attached to certain vacancy publications.

5. Results

The Jobs256 Mobile app was submitted to the Google play Store and got a total of 719 unique installations with no crashes and bugs reported during the test period over a period of 378 days which yielded an average rating of 4.4. It was noted that the number of unique users who installed the app on one or more of their devices for the first time shot rocket high in November period when most leading employers like Uganda Revenue Authority, Barclays Bank, Ernest & Young conduct fresh graduate recruitment.

Figure 5: Average Store Ratings by users out of 5.

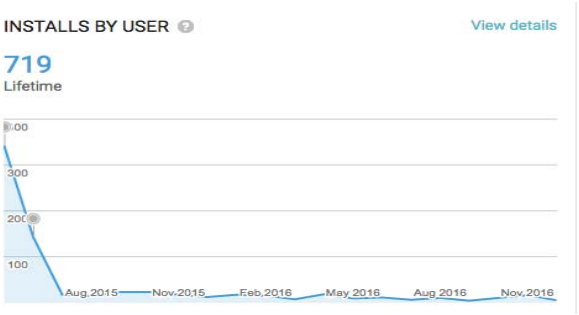

Figure 6: A graph from the Google Play Store showing total Application Installations.

With a user acquisition rate of 14.3%, the application made tremendous growth through the ranks to earn a spot in regionally recommended apps to new play store users. Deeper analysis of user reviews and feedback on the play store led to iterations which delivered more functionality as requested by the users. Three versions were built i.e. 1.0, 1.1 and currently 1.2 based on the users' feedback and reviews.

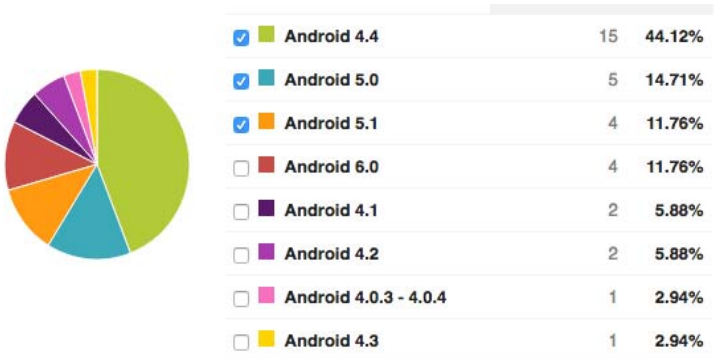

Figure 7: Android version of phones with the application installed after on day two of deploying the very first version 1.0

Results from the study showed that the use of mobile technologies to share job related information does not only help to reduce costs but quickens information flow and eventually leads to faster business processes. Results showed that majority Android phones that installed the application were running android 4.4 which is code named Kitkat. Never the less, necessary SDK adjustments had to be made to support the application on earlier and newer versions of Android. The application required 24-hour support which was unavailable due to resource constraints but a Facebook page was opened and linked to the

"Help" module of the application in a bid to gain crowd and social support. The purpose of the page was to provide a forum like platform where users could ask questions about the app and have them answered by fellow users. The move attracted a community of more that 2,000 people under the page name "Jobs 256".

6. Business Benefits

6.1 Cost

Employers are charged a high cost to advertise in the local newspapers. Jobseekers can only access newspapers at a fee because online newspapers have limited information. Moreover, accessing an advert from a portal requires that the whole webpage is downloaded which is costly. Therefore, it is expensive for both employers to advertise and jobseekers to access job adverts. Hence employers and jobseekers will benefit from the Jobs256 app where adverts are posted and information is accessed at a less cost of internet data. The app uses XML to pick relevant content from the website so that the job seekers do not have to download the entire content from the website and hence use less data. The app minimises discrimination of gender, sex, age, fastens the process of finding qualified applicants and employers and helps reduce the number of unemployed youth.

6.2 Usability and Process Automation

When using traditional approaches like websites, applicants need to have prior knowledge about the existing web portals that advertise job openings. Accessing these portals is costly in terms of data and time because the entire webpage has to be downloaded for information to be accessed. It should be noted that access to computers is more limited that newspapers and the not all applicants have knowledge of operating the computer. Another challenge is that Web portals lose information when the applicant logs off. Therefore, the use of the mobile app was unprecedented in this context since mobile phones are accessible, easy to use and learn and owned by youth looking for jobs. The app offers an offline cache that can be accessed without data connectivity and in areas with limited connectivity. The app is linked to a Facebook page https://www.facebook.com/256jobs/ that promotes social learning for novice users and those with problems using it. The App was released under an open source licence agreement.

7. Conclusions

The main findings indicated that incorporating technologies (Push notifications, Bookmarks and Offline functionality) enhanced affordability and accessibility to information. The Jobs256 mobile app is of importance to places with limited network connectivity due to its offline sync feature that enables users to access job opportunities offline at a later time. The app is not only saving employers monetary resources but provides a sustainable and practical way to link Job seekers to available job vacancies.

Based on the results, the researchers recommend the use of the 256 mobile app due to its wide availability, sustainability and ease of use when sharing information linked to job opportunities and related information.

In future the app will be updated to address concerns raised by users, however, it will not be commercialized since it is a community development project. The development costs and implementation is a possible pitfall. Progress is yet to be made with user sensitization through "How to" webinars and Frequently Asked Questions (FAQ) for the app. The dynamic mobile operating system versions will require regular updates to ensure compatibility. In the next 2 years we expect the user base to grow by 20,000 by improving the functionality to share to major social media channels and rigorous advertisement. Future studies in this field should look at making the application available for other mobile phone

platforms like IOS, Windows and Blackberry OS. There is need for a location based service that can recommend users for jobs within their location. The opportunities for greater research cooperation between Europe and Africa are Europe tapping into the growing market of the middleclass in Africa and Africa learning from Europe's best practices as a bench mark for ICT innovations.

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