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Intelligent Decision Support System for University Admission and Placement

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ABSTRACT

Every year the number of applicants seeking for admission into Nigerian Universities increases year by year however, the Universities lacks the commensurate facilities to meet the challenges of admitting the high number of applicants. For this reason, the admission officers have to manually evaluate every candidate's data against the set admission requirements to screen the applicants in order to select the number of candidates that their universities can accommodate. The procedures involved are very cumbersome, time consuming and prone to a lot of human errors and irregularities. In this work, a decision support system was designed to considerably take care of the above problems. The system was developed to provide a time-efficient, detailed and unbiased automated procedure for selecting the most qualified candidates for admission into universities, and ensure that qualified candidates, who fail to meet the requirements for a particular course, are automatically placed into other courses for which they meet the admission requirements and where vacancies exist. The model also provides an avenue for students self-screening admission system.

Keywords: *Decision support system, admission, University, Applicants.*

BACKGROUND TO THE STUDY

Higher education in Nigeria was introduced 1932 when Yaba Higher College was established for the purpose of producing assistants who would relieve the then colonial administrators of menial tasks. Then in 1940, the University College, Ibadan was also established but the programme offered there were narrow because the agenda of the colonial administration did not include the training of high-level manpower for many of the professions. The Ashby Commission in 1960, recommended the establishment of regional universities in the then three regions of Nigeria. Three universities were established: the University of Nigeria, Nsukka (1960) in the Eastern region, the University of Ife, now Obafemi Awolowo University (1961) in the Western region and Ahmadu Bello University, Zaria (1962) in the Northern region, while the existing University College, Ibadan was granted full-fledged University status in 1962. Also, the University of Lagos, Akoka came into existence in 1962 and as a city University, it provided courses in law, social sciences, medicine, humanities, engineering and part-time programmes for working students. Lastly, the University of Benin was established in 1970, making the sixth of the Universities that have come to be known as Nigeria's first generation Universities (Adesina, 1988).

Today higher education system in Nigeria is composed of universities, polytechnics, institutions of technology, colleges of education that form part of, or are affiliated to, universities, and professional, specialized institutions. They can be further categorized as Private, State or Federal owned institutions. Fourteen (14) Federal universities categorized are owned and funded by the federal government, while state universities are owned and financed by the states (there are 36 states in all), and Private universities are owned and funded by individuals or religious organizations. As seen from above, the first generation universities are the six universities established in the 1960s and early 1970's; second generation universities are seven universities established in the mid 1970's; while third generation universities refer to the eleven institutions, including the universities of technology, established in the 1980's and 1990's (Hartnett, 2000).

According to the National Universities Commission (NUC) report on the results of the November 2005 System-Wide Accreditation Exercise, there are twenty-five (25) Federal universities including three (3)

universities of agriculture, twenty (20) state universities, twenty (23) Private universities, five (5) degree-awarding colleges of education, sixty-nine (69) National Certificate in Education (NCE) - awarding colleges of education, one (1) military university, four (4) inter-university centres. This gives a total of one hundred and forty-two (142) higher education institutions excluding the polytechnics and the ten (10) newly approved private universities in 2006. Higher education in Nigeria can be further divided into the public or private, and the university or non-university sectors. Public universities, owned by the federal and state governments, dominate the higher education system. The none University sector is composed of polytechnics, institutions of technology, colleges of education, and professional institutions. There is no sharp distinction between the university and the non-university sectors; most of the institutions in the latter sector are affiliated to universities.

There are three levels of university education in Nigeria. The university level first stage offers a Bachelor's degree after a minimum of three years and a maximum of six years study (in medicine). The university level second stage offers a Master's degree following one year of post-Bachelor's study or one of post-graduate diploma study and a year of post-Bachelor's study in the relevant discipline. The university level third stage offers doctorate degree of two to three years duration after the Master's degree. To gain admission into the first level of university education, a Prospective student has to pass the competitive University Matriculation Examination (UME).

Nigeria like most nations of the world, the University is the highest citadel of learning for the production of high-level human resources for the labour market. In recognition of this and the role of higher education in perpetuating national unity, the Federal Government of Nigeria took appropriate steps to ensure equity with regard to access to university education. The Joint Admissions and Matriculation Board (JAMB) was created by Act No. 2 of 1978 of the Federal Military Government (JAMB, 2004). The main aim for the establishment of the Joint Admissions and Matriculation Board (JAMB) was to provide an opportunity for eligible Nigerians to have access to university education, and to diversify the intakes, and achieve a high rate of national spread in the placement of applicants into Nigerian universities (JAMB, 2004). In addition, the JAMB was to place suitably qualified candidates into the existing tertiary institutions after taking into account the vacancies available in each tertiary institution. Placement was to be done on the basis of merit, catchment 16 area, and with a special focus on females and the Educationally Less Advantaged States (Omoike and Aluede, 2007).

The Federal Government controls the universities and other higher education institutions through the following organs: the Federal Ministry of Education; the National Universities Commission, which among other things allocates funds to. However, records show that well over 500,000 candidates seek placements into universities annually in Nigeria and only about 13% (on approximation) of them secure admission, which is far from the target. Admission decisions are made by educational institutions by considering a variety of factors. Some of the evaluation criteria normally used are: JAMB UME subject combination; university's admission requirements; overall scores in JAMB UME results; UME merit cut-off score; five credits obtainable in 'O' level certificate (in not more than two sittings); catchment area considerations;

The main aim of this study is to develop and implement a web-based model for the Admission and Placement of Prospective Students into Nigerian Universities with the following specific objectives;

i. To design a model which evaluates potential students' data against University admission requirements thereby streamlining and automating the processing work involved in student admission and placement procedures.

ii. To place qualified candidates into their preferred course of study and to assign an alternative course for candidate not qualified for their chosen course.

Decision support systems are applied in many academic activities as in Mazen and Samy, (2017) discussed the major requirement of applying decision support system in an institution of higher learning, Dyah, Juliana and Dewi (2014) developed a decision support system that can help students of higher learning to select their majors. Daniela and Ivan (2012) provide a framework for decision support system of predictive maintenance for civil engineering. Adeel, Maqbool and Baber (2008) provide a conceptual model for decision support system based business intelligent for university in the aspect of e-learning. Vasile, (2015) made an analysis on the major requirement of decision support systems in an institution of higher learning. Vassilis, Nikolaos, Michael and Vaia, (2014) designed and analyzed a web based decision support system for choosing higher education studies. Suhirman, Jasni, Haruna, and Tutut (2014) applied data mining approach to decision support system. Made, Anak and Irwansyah, (2015) provide a decision support system for selection of course in the institutions of higher learning. Dervis and Ibrahim, (2002) an academic decision support system for evaluating and assessment of students and academic performance. Alotaibi, Ayesh, and Hall (2016) developed a framework for managing admission in Saudi universities. Rajan & Nripendra, (2011) provide an intelligent decision support system for admitting students in an an institution of higher learning.

METHOD

The university admission and placement system is built around a three-tier architecture model. At the base of the application is the database tier, consisting of the database management system that manages the database holding the data that users create, delete, modify, and query and MySQL relational database is used to provide the required functionalities. This problem has remained difficult to surmount because, for any admission and placement process, several admission criteria are considered and the candidates' data would have to be manually evaluated against the various admission requirements by each university's admission officer before selecting the few qualified candidates. And this is not an easy task. Every Nigerian that seeks admission into the University must have one thing or the other to do with one of the following agencies:

1. Joint Admission and Matriculation Board (JAMB)
2. West African Examination Council (WAEC)
3. National Examination Council (NECO)
4. National Teacher's Institute (NTI)
5. Interim Joint Matriculation Board (IJMB)
6. National Business and Technical Examination Board. (NABTEB)

SYSTEM REQUIREMENTS

The basic hardware requirement for the university admission and placement system is a simple local area network with a server and client machines. The client side requires no more than the standard Internet browser installed on the local computer while the main application functionality is assured by the server side. However, a single computer system may also serve as a server and a client machine. It also requires a network link to be able to link JAMB or NECO or WASC network. The computer system may be a simple Pentium system with monitor and printer. The basic software requirement for the system is Apache, MySQL and PHP (AMP) presented in chapter 3 section 3.2, and Windows Operating System.

SOFTWARE PLATFORM FOR IMPLEMENTATION

The technological approach for the development of the system is based on AMP (Apache, MySQL, and PHP) open source solution (Adewale, 2006). Other solutions such as Microsoft's Internet Information Server (IIS) are popular, but they lack security and attract potential higher cost of hardware and maintenance, which keep them out of reach of many small organizations. Rather than spending millions of dollar on licenses and administrative costs for inferior products, one can choose to run a free software solution. Speed is another significant factor. The system being designed needs to respond quickly and remain snappy throughout the user's experience. With proper coding techniques, PHP is many times faster than Microsoft's ASP or Sun Microsystems' Java platform.

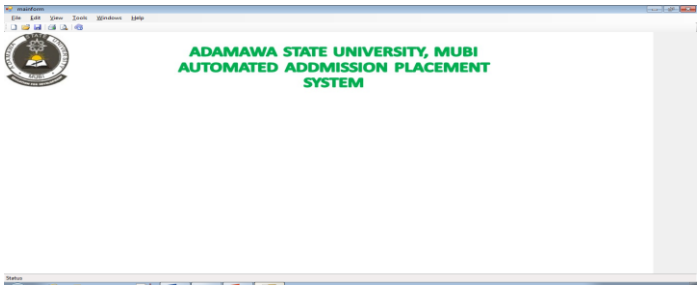

Fig. 1. University Admission and Placement Home Page

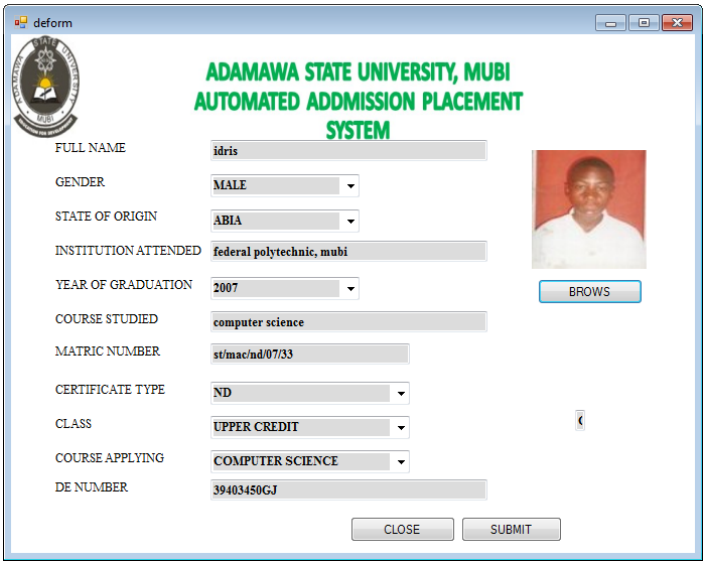

Fig. 2. D.E, Application form

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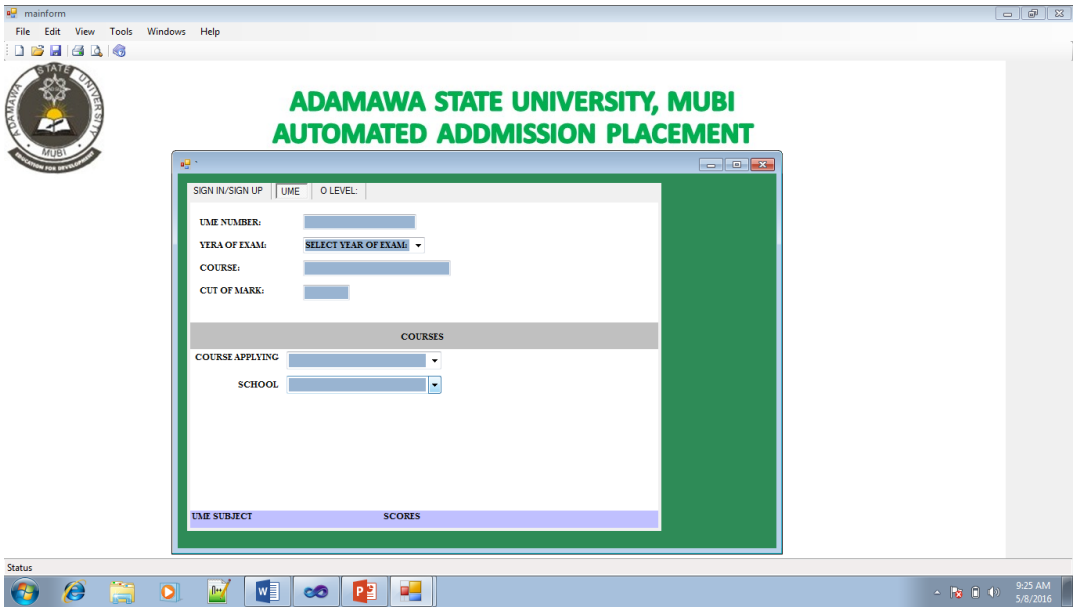

Fig. 3. Candidates' Self Evaluation Form Page

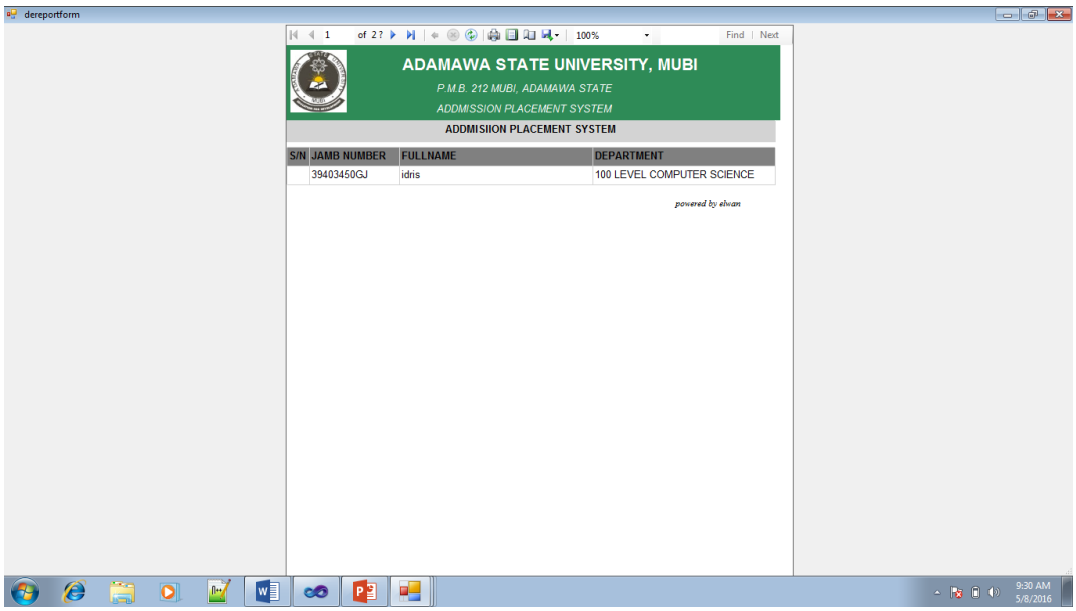

Fig. 4. D.E. Admission Placement Report

CONCLUSION

Technological advancements particularly in the area of information and communication technology keep growing by leaps and bounds and on a daily basis. Keeping abreast and taking advantage of these technological advancements is a paramount concern to users, for solving encountered societal problems. Apart from the manual system of university admission and placement being cumbersome and time-consuming, it is rife with a lot of irregularities which is understandably due to our human weaknesses and ineptitude. Successful implementation of this research study will not only ensure that the most qualified candidates are offered admission into Nigerian universities, it will also take care of the irregularities and provide opportunities for candidates to be automatically

placed into courses (other than their chosen ones), for which they are most suited. And of course, it will give credence and transparency to the admission process by providing avenue for candidate's self-screening.

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