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A Guidance and Counseling Mobile Application (GC Mobile App) for Educational Institutions

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Article Info	Abstract
 	Information and Communication Technology has become a veritable tool in today's world and most aspects of human activity related to business, health, education and financial sectors are dependent on this technology. Guidance and counseling activities are becoming more popular in schools and a guidance and counseling application (GC Mobile App) is necessary to bring disturbed students in an institution and the counselors to a platform online where they can easily communicate on problems facing the students at any particular time even when they are far apart. The Centre for Distance Learning of a Federal University in Nigeria was used as a case study. Face-to-Face interview was utilized to gather data, the existing guidance and counseling system was studied and the challenges associated with it were highlighted. This guidance and counseling system utilized genetic algorithm techniques in its design and will improve the quality of counseling services rendered since the counsellor can be contacted anytime and the student's progress can be monitored.

1. Introduction

Counseling is a vital service that assist students in selecting the most appropriate options for them, discover and develop psychological and educational abilities needed for their wellbeing and to fulfill their ambitions; while guidance results in self-development for the purpose of helping a person plan wisely for the present and future. Guidance and Counseling as a discipline is an integral part of every standard institution. Students need the services and supports of counselors from time to time on issues related to their academic pursuits for good and consistent academic performance and how to handle any issue or that influences this quest adversely [1]. Institutions set up student counseling environments to enable students balance their emotion, social life with academic performance [2], [3].

A guidance and counseling activity no doubt is important for the institution and the student to achieve their purpose [4]. A typical counseling session requires the counsellor and the student to meet physically at a particular location to discuss burning issues. This makes it mandatory that both persons involved must schedule a particular time to meet, which may take some time (days or weeks) to work out. It is also required that the meeting is at a set location. All these are hindrances of manual or routine counseling sessions in institutions. The pending issue may sometimes escalate, the individual may breakdown or take a wrong step which could have been averted if there was

timely intervention. Also, a face-to-face interaction is involved in routine counseling which makes it difficult for introvert students to freely express themselves or divulge sensitive information that will help the counselor give appropriate advice or therapy/solution to their problems.

Institutions have professionals in that field as staff who are responsible for student counseling, this makes it hard for students who do not like the counselor to keep their problems to themselves or tell it to the wrong party which can lead to more serious problems, considering the fact that students generally have different needs, interests, traits and behaviors. The counselor as a human being can also be tired of some students when the case becomes prolonged and difficult to resolve. These highlighted weaknesses of routine guidance and counseling in institutions necessitates an intervention. Leveraging on the benefits of Information and Communication Technologies (ICTs), this study was conducted to improve guidance counseling process and its outcome. Implementation of GC (mobile App) will enable students to communicate with counsellors using phone calls, video calls, e-mails, text-messages, face book, whatsapp and other social media platforms.

Nowadays, applications are developed to run on mobile devices as a current trend because as much as possible technology should bring solutions to the doorsteps of users. A user does not need to be in a particular location to perform routine operations with the power of computing devices. Improvements in internet technology has helped to boost mobile computing. Examples of mobile devices are smartphones and tablet computers. They are designed for portability hence mobile devices are compact and lightweight. Mobile devices are hand-held which makes it suitable for mobile applications and they are always available to users. It is worthy of note that till date, the integration of ICT in guidance and counseling has not been fully explored [5].

1.1. Related Works

Counseling is an important aspect of school administration in current technological generation. The Federal Ministry of Education, Nigeria introduced Guidance and Counseling in institutions to enable students develop adaptive skills necessary to cope with changing situations, diverse members of school communities and make right choices. It was also aimed to help management of institutions satisfy identified needs and be better equipped for proper administration and development of students with great academic achievements who will easily integrate into mainstream activities of society after graduation [6]. [7] and [8] opined that Guidance and Counseling services in an institution enhances the quality of education and helps in the well being and mental stability of students. According to [9] guidance entailed a series of formalized services and [10] explained that counseling was a two-way process that required among other things collaboration, exchange of ideas and a supportive relationship.

Studies investigating trends in counseling abound [11], [12], however attention of researchers have been on a meaningful integration of ICT in counseling activities, for the benefit of potential clients ([14], [15], and [16]) call for ICT techniques and tools to assist psychologists, teachers, amateur and professional in guidance and counseling. [16], [17] and [18] outlined benefits that accrued from the use of this technology in counseling while [19] highlighted ICT use in counseling was trending and quoted [20] and [21] recommendation for the provision of ICT for counselors, teachers and students. Studies abound on the relationship between ICT and guidance ([22], [23], [24], [25]). [26] stressed that ICT has changed the way Guidance and Counseling is conducted. Hence [27] enjoined counsellors to deploy information and communication technology in counseling practice and [28] reported that counselors showed positive attitude to the use of ICT in their guidance work after they acquired necessary training. [29] highlighted the ease of tracking students' progress and following them up based on stored records available for data analysis and decision making as a major advantage of conducting counseling using ICT technology. Proper deployment of ICT in the management of guidance records has also been shown to assist decision makers and guidance

counselors in planning, organizing, and assessing guidance services while taking appropriate steps to address student needs.

According to [31], guidance and counseling help students attain social, psychological and academic maturity. Counseling has contributed immensely to student's academic success ([32], [33]).

[34] opined that ICT is an indispensable tool for effective guidance counseling service needed to achieve sustainable educational development in the 21st century and highlighted the challenges associated with the use of this technology in counseling process amongst which was the shortage of ICT-complaint counselors. Guidance and counseling professionals face challenges associated with how to efficiently use ICT to carry out their jobs especially rendering services.

[3] corroborate with a previous study by [35] that a students' retention contributed to less than fifty percent of their academic performance but depended also on the student's emotional and social behavior, hence universities established students counseling environment to help students balance their emotions, social life with academic performance

[36] developed a web-based Career Guidance and Employment Management System that allowed different clients to make best career choices. This helped to provide the needed direction for job seekers to identify and pursue careers appropriate to their qualifications and skills.

[37] showed that students involved in online counseling wanted to know about their counselor's background since they could not see them physically so that they could feel relaxed divulging sensitive and personal information to them.

A web-based counseling system in health care was developed by [38] while [39] proposed eight categories of quality attributes for mobile applications which include usability and humanity, look and feel, performance, operational, maintainability and support, security, legal, cultural and political. These are features vital to achieving user satisfaction which is primary to software development.

2. Methodology

The research tool used was a face-face interview with the distance-learning guidance counselors of the University of Benin in order to understand the existing system for guidance and counseling. This study adopted this tool because it has been shown to be an integral part of good quality career guidance and recommended to help institutions achieve quality in career standards [40].

We however adopted the following concise steps in carrying out this work;

    a. Getting the necessary requirements from a trained Guidance Counselor and we approached one of the Counselors at the Centre for Distance Learning, University of Benin.

    b. Interview of Counselor, and several other re-interview sessions to perfect our requirements.

    c. Getting the right procedures for handling students into an algorithm/ flowchart form

    d. System design of the different steps to follow and the individual design and overall architecture

    e. Selecting a suitable programming language for coding the mobile app.

    f. Coding and implementation of our codes

    g. Testing and re-testing of the codes

    h. Final deployment and use.

2.1   System architecture

Each component of the proposed system is discussed as follows:

a. **Login**: The login module allows registered users access to the system

b. **SignUp**: The signup module allows first time and so unregistered users access to use the App. In this module users provide useful information as requested by the system for example Students Matriculation Number, Surname, First Name, Department and Faculty, Course of Study, Level of student and other personal information

c. **Add Diary**: This module allows users to create and store memoir .

d. **Talk to Counselor**: This module allows the student (user) chat with the chosen counselor

e. **Database**: The database will contain records of users.
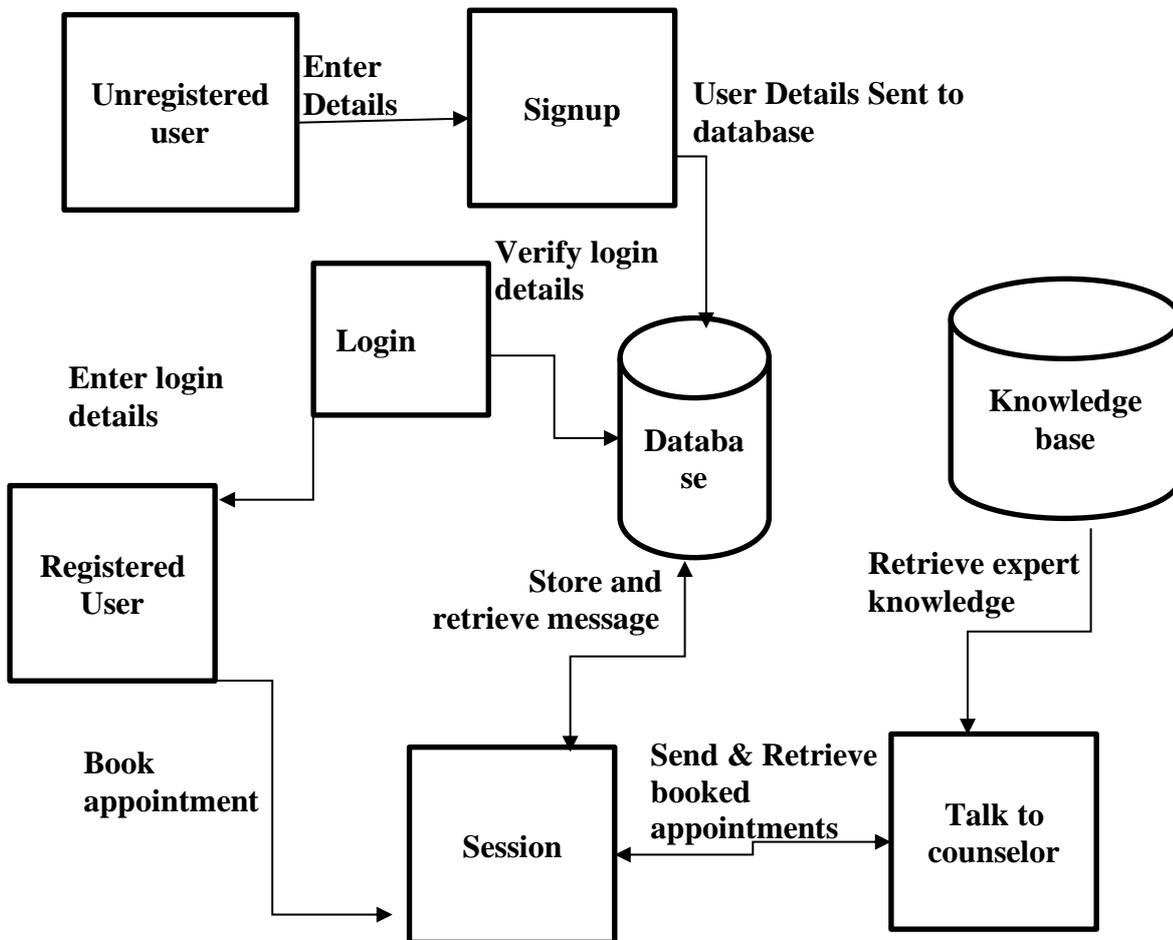

Figure 1: Architecture of the proposed system

2.2   Use case diagram

The use case diagram captures the system and sub system behavior. It shows the interaction of actors with the system to depict the functionality of the system. An actor is a user (external or internal) that interacts with the system. Actors participate with one or more use case by exchanging messages **[41]**. The actors in the system are the users of the system which includes the guidance and counseling staff, system administrator and students among others.
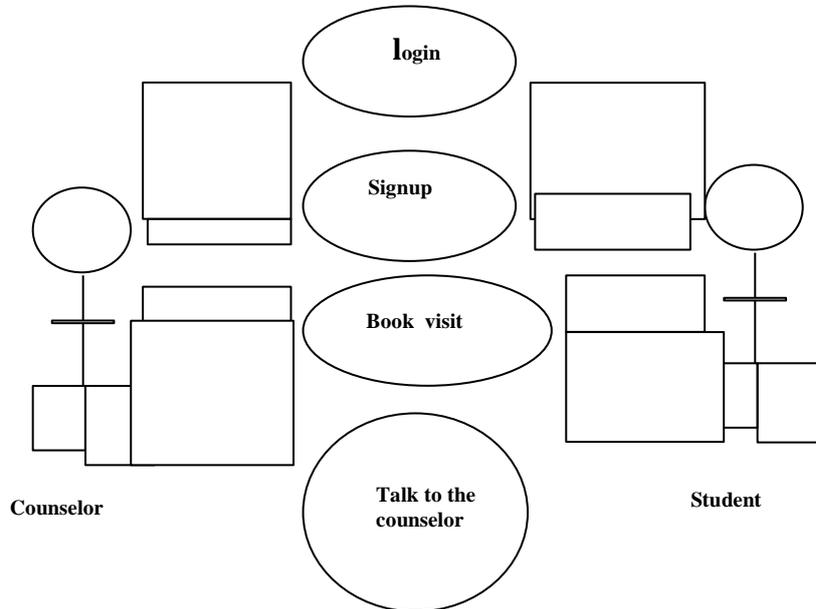

Figure 2: Use Case diagram for the proposed system

This designed system was built with HTML and ionic for the front-end development, Angular JS for the back-end development.
The tools used in developing the system are was carefully selected considering their features of accessibility and also because they are more effective. The mobile application was wrapped in the cordava framework that can be installed as a native mobile application across multiple mobile device platforms easily. The other part of the application that controls and interacts with the device (phone, tablets or laptops) was based on the native language for the platform in question. Cordava provides a bridge from the JavaScript end to the native end of the platform, which allows the JavaScript API to access and control the device (phones, tablets or laptops).

The JavaScript components complement Apache Cordava and provides a framework for client-side model-view-controller(MVM) and model- view –view model (MVVM) architectures.
The design of this system was done such that it could be implemented on virtually any mobile operating system. The software components chosen were all from the open-source domain, and hence could be easily ported to any operating system. However, the system was successfully tested on the XP Service Pack 3, Vista and windows 7 versions of the Microsoft Windows operating system.

MySQL a central component of the widely used LAMP (Linux, Apache, MySQL) open source web application software stack was used to manage the database.

3. Results and Discussion

Preliminary interviews and observations of the existing system showed the following:

(i) The guidance and counseling system is more physically inclined than it is technologically.

(ii) Most students do not go for counseling until they have become victims of academic failure, depression, drug addiction or mental breakdown. This may not be unconnected to a lack of proper data capture technique for tracking and analyzing data, which will help the counselor to monitor the emotional and academic progress of the counselee.

(iii) The counselors had inadequate knowledge of how to use computer for her job so needed to be trained.

(iv) Students find it difficult to relax and express themselves whenever the environment is not conducive for discussion during counseling session.

(v). There are sometimes cases of clash in appointments or unscheduled visits where students randomly show up for sessions and the preferred counselor is not around or is attending to another student.

(vi). Response from counselors also showed that the need privacy for effective counseling activities always possible due to lack of office space, so they sometimes had to make do with the settings of the office without the needed seclusion.

(vii) Another important finding during the interview was that counseling forms were available designed to capture information from students.

[42] stated that evaluation of an existing system gives helpful insights for the design system. The existing system can be described as inconsistent, unreliable and inefficient. Based on all the identified flaws of the existing system, the implementation of a mobile application system became imperative. This is because a mobile App provides convenience, ease of use, accessibility, understandability, usability, cost effectiveness and simple user interface.

In this study, a web application to automate and handle the process of guidance and counseling was developed and deployed. The application makes use of a database which stores all entries from the student's registration document. The technical perspective of this project has to do with the development, deployment, testing and maintenance of a web-based mobile application system which are all software engineering processes.

The proposed system is technically, operationally and economically feasible.

The proposed system solves to a great extent, the problems of the existing system, which includes identified challenges associated with the difficulties that students encountered visiting the counselors. They had fears about the confidentiality of any personal information made available to the counselors since they knew them and would recognize them anytime and anywhere they met each other. It solved the problem of clash in appointments as no student would schedule an appointment for a time when it was not convenient and the new system helped counselors to focus solely on one student at a time.

Communication between a counselor and counselee could take place anywhere and everywhere at anytime. This helped to address urgent issues as there was no limit to accessibility. Introvert students could easily express themselves without the prowling eyes of others especially if serious personal matters were being discussed. Remote counseling sessions were possible.

The proposed system will be deployed on the internet. This App can be integrated into the University's web platform and made available to all students who will be trained on how to use them. Also, as part of students registration exercise every academic session, necessary information should be gathered from students to know those that need counseling and keep them under close surveillance inviting them from time to time for chat sessions. Course advisers should also collate

the results of students with poor academic performance and send them to the Guidance and Counseling Department for proper evaluation, advice and counseling.

a. **Home Screen**: This is the first page you see when you open the application of your mobile device. This is the page that welcomes the user to the platform.

Figure 3: Snapshot of the Home Screen

b. **Login Screen:** This page is needed to authenticate the student and the counselor. The basic flow is the application request for email address and password. The user clicks the login button, then the application checks to validate entered details, the application goes on to post the data to the server and the server responds with a user id, then the application logs the user in.
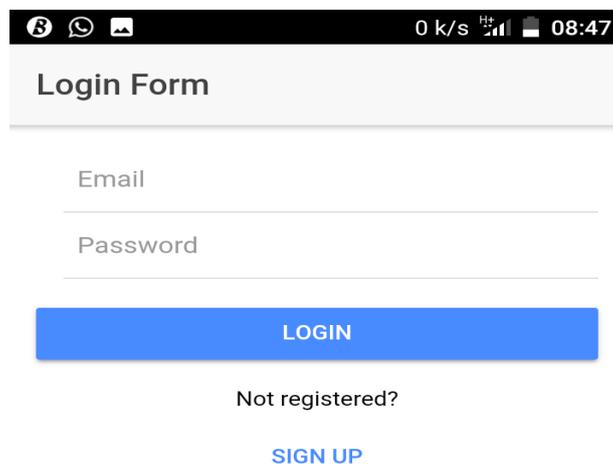

Figure 4: Login Screen

c. **Signup Screen**: This is the page that registers a student as a user or a staff as a counselor. The application requests for fullname, email, password, gender, age, and phone number. The user clicks the signup button, the application checks to validate captured details, the application posts the data to the server, the server responds with a user id, the application registers the user. The password length should not be less than 6. If there's any error, the user is notified.
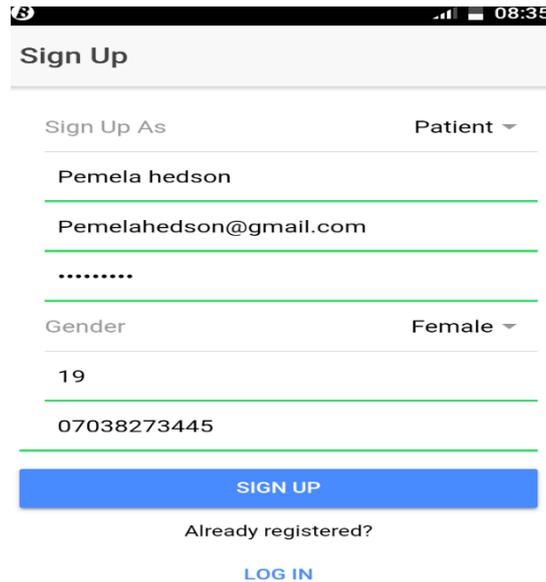
Figure 5: Signup Screen

d. Diary Screen: This is the page the student or counselor creates their memoirs. The application checks to validate details, the server responds with a message, the application informs the user that the diary item is successfully created.

Figure 6: Screenshot of the Diary screen

e. Talk to Counselor Screen: This is the page where the users interact, it is a chatroom that allows the student and counselor to communicate. The student clicks the "Find the counsellor button", the application responds by finding the counselors and lists them to the user. The student checks the list of counselors and selects one by clicking the connect button. The application posts the selected counselor's data to the server, the server responds with some information the application receives the responses from the server and then creates a chat session page between the student and the counselor.
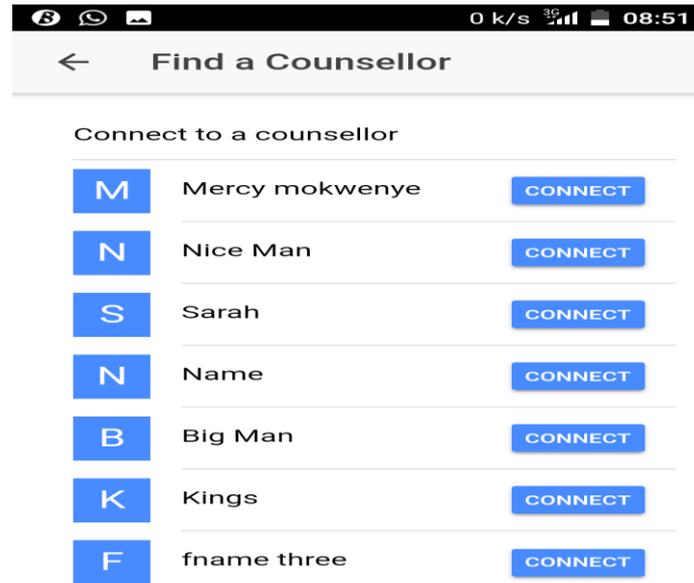
Figure 8: Snapshot of the Find Counselor screen

The unit testing of GC Mobile App ensured that each module and subsystem of the entire software was tested independently with various input parameters and expected responses were analyzed and the appropriate modifications effected. The system was found to be functionally dependent. The entry point for this application is the login page. This login form serves as the security point where users provide authentication information before they are allowed access to the counseling page. Other pages include the registration page.

4. Conclusion

Our proposed system makes it possible for students to see a counselor anytime and from any location without having to visit them in the office. The Mobile App allows them select counselors of their choice for registered users if they prefer that option or randomly select from a pool of available counselors who are highly qualified and understand the importance of the confidentiality. The new system was implemented and series of tests were carried out to ensure its functionality.

The application is still open to further research and modifications to increase its security and efficiency. The application is subject to periodic updates in order to improve the user experience.

References

[1] Moeller, B., & Reitzes, T. (2011). Integrating technology with student-centered learning. Quincy, MA: Nellie Mae Education Foundation.

[2] Onyehalu, M.T. (2005). The place of guidance and counseling in personal development .Journal of Counseling and Communication, 1(2); 58 – 60.

[3] Dobele A. R., Gangemi, M., Kopanidis, F., and Thomas, S. (2013). At risk policy and early intervention programmes for underperforming students: Ensuring success? Education+ Training. 8; 55 (1):69-82

[4] Priya, N. B. and Juvanna, I. (2014). An Android Application for University Online Counseling. International Journal of Computer Science and Mobile Computing. IJCSMC, Vol. 3, Issue. 2, 261 – 266

[5] Tuazon, J. L. and Tacuban, T. N. N. (2017). Guidance and Counseling Information Support System. Asia Pacific Journal of Multidisciplinary Research, Vol. 5, No. 1, 9-15.

[6] Egbo, J.O.E. (2012). Unlocking the potentials of secondary school students through guidance and counslling. ANSU Journal of Integrated Knowledge 2(1) 01-07.

[7] Egbo, J. O. E. (2015). Guidance and Counselling: A creativity for promoting sustainable well being and adjustment of secondary school students in Nigeria. British Journal of Education, European Centre for Research Training and Development UK. 3(10), 49-57

[8] Omebe, S.E. (2005). Guidance and Counseling: A comprehensive approach. Enugu: Cheston Agency Ltd.

[9] Denga, D. I. (2001) Guidance and counselling in school and non- school settings Port Harcourt: Double diamond publications.

[10] [Egbochukwu, E.O. (2008) Guidance and Counselling: A comprehensive Text. Benin City: UNIBEN Press.

[11] CEDEFOP, (2008). From policy to practice: a systemic change to lifelong guidance in Europe, Luxembourg

[12] [CEDEFOP, (2011). Working and ageing: guidance and counselling for mature learners, page I-12

[13] Hooley, T., Hutchinson, J., Watts, A.G., (2010). Careering through the web, UK Commission for employment and skills. London

[14] Watts, A.G. and Dent, G. (2008) The evolution of a national distance guidance service: trends and challenges. British Journal of Guidance and Counselling, 36(4)

[15] Akhigbe, B. I., Akhigbe, O. O., Gambo, I. and Afolabi, B. (2017). ICT: An Emerging Paradigm for success in Nigeria. IT Professional IEEE Computer Society, 19(6):13-17

[16] Iacob, M. (2012). Good Practices in the Use of ICT in Providing Guidance and Counseling, Inst. of Educational Sciences.

[17] Othman, M., Othman, Z. and Aziz, M. (2006). Student Management System in schools: The use of web- based applications. J. Gading, 10(1), pp.87-98.

[18] Othman, M., Othman, Z. and Aziz, M. (2008). Implementing the web-based student management system in school: A study of system usability and its contribution to the school community. Proceedings of the National Seminar on Science, Technology & Social Sciences (STSS), pp. 577-586

[19] Oraegbunam, N. M. (2009). Applying information and communication technology in counselling practice. Procedia - Social and Behavioral Sciences 1(1): 1749 - 1752

[20] Maduabum, M.A. (2004). Effective Science and computer education programme in the new millennium: Implication for secondary education. In D.C.U. Ezema (Ed.), Effective science and computer education programme in the new millennium. Abuja: Famray Digital Prints.

[21] Okebukola, P.A.O. (1997). Forty years of intervention of the STAN in science education and the road ahead. In A.O Olarewaju (Ed.), Proceedings of Ajumogbogia Memorial Conference in Commemoration of the youth anniversary of STAN (16-39). Ibadan: Heinemann.

[22] Watts, A. G. (2002). The role of information and communication technologies in an integrated career information and guidance system: A policy perspective. International Journal for Educational and Vocational Guidance, 2(3), 139–155.

[23] Bosley, C., Krechowiecka, and Moon, S. (2005) Review of Literature on the Use of Information and Communication Technology in the context of Careers Education and Guidance. Derby: Centre for Guidance Studies, University of Derby.

[24] Watts, A. G. and Offer, M. (2006). The current and potential role of ICT in delivering information, advice and guidance. IAGWP6. Derby, UK: Centre for Guidance Studies, University of Derby.

[25] Vuorinen, R., Sampson, J. P., & Kettunen, J. (2011). The perceived role of technology in career guidance among practitioners who are experienced internet users. Australian Journal of Career Development, 20(3), 3947

[26] Watts (2001). Career Education for young people: Rationale and provision in the UK and other European Countries. International Journal for Educational and Vocational Guidance. 1(3). 209 -222.

[27] Paisley, P.O. & Hayes, R.L. (2003). School counseling in the academic domain: Transformation in preparation and practice. Professional School Counselling,6:
    a. 198 – 204.

[28] Vinluan, Lorelei R. (2011). The Use of ICT in School Guidance: Attitudes and Practices of Guidance Counselors in Metro Manila, the Philippines. International Journal for the Advancement of Counselling.International Journal for the Advancement of Counselling, 33(1), 22–36

[29] Willey,K and Andrew,N.G (2011), In Ray. M (2014) Guidance and counselling, what is Counselling: Meaning, Need and Significance, [Online] http://teachereducation guidance and counselling. Blgspot.com/2011/03/what is counselling meaning need and html (July 2016).

[30] Ebizie, E. N., Enajedu, E. E., and Egenti, N. (2016). The Role of Guidance and Counselling in Effective Teaching and Learning in Schools. International Journal of Multidisciplinary Studies. Vol. 1(2),pp36-48.

[31] Overton, S.V. (2004). The school counsellor: An essential part partner in today's coordinated school academic climate. Journal of Guidance and Counselling, 20(3), 21-32.

[32] Beesley, D. (2004). Teachers' perceptions of school counselor effectiveness: Collaborating for student success. Education, 125(2), 259-271

[33] Okere A (2005). The effective school counsellors: Perception of students, teachers and counselors. J. Educ. Foundations, 1:147-152.

[34] Ekechukwu, R. O. and Eze, A. F. (2016). ICT an indispensable tool in effective guidance/ counseling services for sustainable educational development in secondary schools in the 21st century in Imo State, Nigeria. European Journal of Education Studies. Vol. 2, Issue 3. 23

[35] Gerdes H, Mallinckrodt B. (1994). Emotional, social, and academic adjustment of college students: A longitudinal study of retention. Journal of Counseling and Developmen: JCD; 72(3):281.

[36] Seng, K. and Zeki, M (2014). Career Guidance and Employment Management System. Third International Conference on Advanced Computer Science Applications and Technologies. 73 – 78.

[37] Shiono, Y., Nishiro, T., Goto, T., Kato, C. and Tsuchida, K. (2009). Development of Web Counseling System. International Conference on Network-Based Information Systems. IEEE; 370 – 375.

[38] Col, N. F. (2007). Using Internet technology to improve and simplify counseling about menopause: The WISDOM website. Maturitas , 57, 95-99.

[39] Robertson, S. and Robertson, J. (2006). Mastering the requirements process. Addison-Wesley, Upper Saddle River,NJ, Munich

[40] Great Britain Parliament House of Commons: Education Committee and Stuart, G. (2013). Careers Guidance for Young People: The Impact of the New Duty on Schools, Seventh Report of Session. Vol. 2. Oral and Written Evidence; Stationer Office.

[41] Mohammad, K., Farahani, F. K. A., Mohammadi, M. R., Alikhani, S., Zare, M., Tehrani, F. R., and Ghanbari, H. (2007). Sexual risk-taking behaviors among boys aged 15-18 years in Tehran. *Journal of Adolescent Health*, 41, 407–414. doi:10.1016/j.jadohealth.2007.05.003

[42] Kuittinen,M., Pontinen, S. and Sutinen, E. (2001). How to design Web - based Counseling Systems. Proceedings of IEEE International Conference on Advanced Learning Techniques.