

Integrated Unified Crime Information Management System



Onu Fergus Uchenna, Ukabuiro Ikenna Kelechi, Douglas Allswell Kelechi, Kingsley Maduabuchi Okorie

Abstract: Crime detection, investigation and prosecution are usually carried out by the various law enforcement agencies saddled with such responsibilities. In this study, an integrated web based unified system was developed and implemented for the five (5) agencies (Nigerian Police Force, National Drug Law Enforcement Agency, Economic Financial Crime Commission, Independent Corrupt Practices Commission, Department of State Services) to enhance domiciliation of crime data into one system for effective information sharing among the five agencies. The methodology adopted for the system design is Object Oriented Analysis and Design Methodology (OOADM) and the tools used are HTML, CSS, JavaScript, MySQL. The result obtained shows that with the integration of the five agencies, accurate records of suspects and victims were timely shared by the various agencies. There is also an effective collaboration among the various agencies in crime detection, investigation and prosecution of suspects.

Keywords: Information - 1, Management - 2, System - 3, Crime - 4, Agencies and LEA – 5

I. INTRODUCTION

Crime is as old as man, and the effects of crime in our society is like an ill wind that blows one no good. Crime as we know is based on human experience, and is as old as the human race. Crime is geographical. It occurs at a specific place, specific time and specific reason. It can affect everyone and anyone at any time. Societies have witness different forms of crimes and have adopted a lot of measures to prevent, reduce or eliminate it. [1], undoubtedly, future directions in crime prevention will be shaped by technological advances and innovations, as yet unknown. Teaching and learning engagement, household, affairs, emotional stability, free time, residential stability, societal togetherness are all outcome of crime in an extended social group having distinctive cultural and economic organization with similar interest, which have effect on crime form, cosmos, oftenness and capacity.

Crime generally is linked to poverty, unemployment, underemployment, racism, poor health care, bad housing, weak schools, mental illness, alcoholism, single-parent families, teenage pregnancy, and a society of selfishness and greed. Our society has witnessed an exponential rate of crime in all most every sector of life and this is due to population, [2] expanded this in his work that sudden rise in population is a supposed effect in the crime rate; making it problematic for Law Enforcement Agencies to work effectively. Effects of crime to our society is very dehumanizing and unfriendly; people live in fears while others (criminals) live in affluence; the poor get poorer and the rich always live in fears. This is a prove that a society with high rate of criminality does not grow like society with less criminality. Crime exist as an essential constituent of a society to the degree that individuals who by long study has gained mastery in one or more discipline and has presented reasons and argument that no human society is free of crime with special significance [3]. Hence, the necessity to have a complex composition of knowledge and their combination or practical application of science to problems that will cut down thereby assisting criminal agencies to produce intended results as peradventure bearing in mind the comprehension between individuals of different countries towards working together. In order to reduce crime, a Law enforcement agency is created with the statutory mandate to reduce crime. Due to this ugly situation that is becoming a new normal, there is need to control or eliminate crime. In order to achieve this, the law enforcement agencies have to be unified in such a way that there will be an easy flow of information in the system. LEA's integration is rendered capable by this system, reporting of crime through the use of mobile phones via short message service (SMS) and crime scene immediate reaction. In a situation of delay in crime case handling, the system provides room for integration by appropriate authority. [4], depicted that the crime occurrence has gave the world at large a thoughtful concern and this calls for measures towards crime discouragement which if left unchecked will reduce the efficiency of the Law Enforcement Agencies in the state. For this institution to function effectively, there is need to Integrate Criminal Information Management System into their work schedule. Many important questions on public safety and protection relating to crime and a better understanding of crime is beneficial in many ways, it can lead to targeted and sensitive practices by law enforcement authorities to mitigate crime [5]. Crime is a threat to the economic, political and social security of a nation, and a major factor associated with under development.

Manuscript received on 01 June 2022 | Revised Manuscript received on 22 July 2022 | Manuscript Accepted on 15 July 2022 | Manuscript published on 30 July 2022.

* Correspondence Author

Onu Fergus Uchenna, Department of Computer Science, Ebonyi State University, Abakaliki, Ebonyi State, Nigeria. E-mail: fergus.onu@ebsu.edu.ng

Ukabuiro Ikenna Kelechi, Department of Computer Science, Abia State University, Uturu, Abia State, Nigeria. E-mail: kenna.ukabuiro@abiastateuniversity.edu.ng

Douglas Allswell Kelechi*, Department of Computer Science, Federal University of Technology, Owerri, Imo State, Nigeria. E-mail: kelechi.douglas@futo.edu.ng

Kingsley Maduabuchi Okorie, Director of Operations in Eagle Haulage, Lagos, Lagos State, Nigeria. E-mail: kmokorie@gmail.com

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an [open access](https://creativecommons.org/licenses/by-nc-nd/4.0/) article under the CC-BY-NC-ND license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

It discourages both local and foreign investments, affects development and reduces quality of life. The Nigerian Government has adopted several strategies towards crime prevention and control such as establishment of security and other Law enforcement agencies. [6], [7]. Criminals today do not have a specific approach which they use in committing crime, also the use of technology by criminals have made crime fighting a more difficult task, and this is an additional task to law enforcement agencies. Criminals will commit crime in a particular region, they will relocate to another where their identity are not known by any individual and they will continue with crime. Having a unified information system for the law enforcement agencies will help to solve this. This unified system will link all the Law Enforcement Agencies together and enable them to share files and information about criminals and their activities in the state as well. Also, citizens will have access to report crime from their home without a criminal / Law Enforcement Agent / Agencies known the source of the information.

II. MOTIVATION

The motivation behind this study is based on the various problems facing Crime Information Management among the various Law Enforcement Agencies in Nigeria which include;

- 1) Lack of integrated crime record system that will aid the various law enforcement agencies to easily ascertain past criminal records of a person.
- 2) Inadequate information of crime suspects.
- 3) Lack of effective collaboration among the law enforcement agencies.

III. OBJECTIVE OF THE DESIGN

The aim of this study is to implement an Integrated Crime Management Information System using object-oriented approach with the following objectives:

1. To create a platform for improved information sharing and collaboration among the Law Enforcement Agencies.
2. To establish agencies, suspects and victim's records relationship style for proper information management.
3. To develop an integrated system for the five (5) law enforcement agencies for proper interaction.

IV. LITERATURE REVIEW

It is very obvious that crime incidence is not accidental, it is well planned and executed by criminals; because of this careful act by criminals, states have adopted a lot of approaches to check crime and one of these checks is the establishment of Law Enforcement Agency. Law Enforcement Agency is that arm of Government with the responsibility to ensure peace and harmony in the state. This responsibility is as a result of the menace of crime in our society [8]. This agency exists in every state/country but their mode of operation varies depending the level of insecurity or crime in that state. In Nigeria for example, the major five agencies responsible for Law Enforcement are: Nigerian Police Force (NPF), Economic and Financial Crimes Commission (EFCC), Department of State Services (DSS), Independent Corrupt Practices and other Related Offences Commission (ICPC), National Drug Law

Enforcement Agency (NDLEA). These agencies have the same goal; which is to avert crimes in a state. [9], pointed that Law Enforcement efforts have focused on improving criminal intelligence to understand the nature and extent of criminality and ultimately to prevent, detect and disrupt crime. These agencies operate in isolation to each other hence lacks the cohesion for proper intelligence gathering. However, many at times, the Federal Government has initiated the joint task force action which incorporates the personnel of the different agencies to work in synergy, but that has also failed due to unavailability of adequate information.

This is as a result of the agencies not having access to a central database which will give access to criminal information and at the right time. Giving careful thought to fear resulting from increment in criminal activities, awareness of danger in Nigeria viz terrorists, armed robbery and other crimes connected either logically, casually or by shared characteristics, easily available by individuals who created groups with related sense of concern and curiosity with networks having power greater than expected as their aim is as a result of crime which presents the lack of power by government to perform towards giving what is desired; security to lives, properties and economic activities conduct. [10] posits that Crimes are a social nuisance and cost the society extremely in many ways. As such, information sharing and effective agencies collaboration is the key to any success story behind every State security architecture in the fight against crime.

According to [11], Criminal Intelligence has become a central tool in modern crime control that is used by Law Enforcement to understand rapid changes in crime and criminality. The development of intelligence relies on the sharing of information between agencies-including Law Enforcement, other government agencies and private sector entities. Sharing information to improve criminal intelligence serves first and foremost to increase knowledge available for decision making. This can help not only to identify which criminal groups to target, but also, in an age of resource constraints, to triage out lower risk cases [12].

Nations with greater accumulation of knowledge/skills as a result of direct participation of activities of securing secret information; national intelligence hypothetical description of complex processes to assist in evaluation by comparing with standards the exercise of criminal intelligence.

The loss of ability with respect to information and intelligence sharing towards producing an intended result becomes the greatest possible degree of endeavours of crime fighters in the states.

[13], posited in his paper where an overview of research conducted through the analysis of academic theoretical studies to provide a foundation for developing good practice investigative and intelligence frameworks were made. The aim is to improve financial crime control, disruption and prevention capabilities by relevant Australian public sector regulatory agencies.

The paper argued that for intelligence to enable prevention, disruption and control of crime to be delivered more efficiently, one key factor was identified as essential that intelligence must be produced in collaboration with the users of the product for its effectiveness to be increased.

This is significant as it demonstrates a philosophical shift from a separated to an integrated structural approach. After providing a thorough examination of historical developments and current situational understanding, the paper concludes by identifying that it is imperative that best practice intelligence structures are developed specifically for the Australian public regulatory sector and that these structures would do well to consider if closer integration of intelligence and traditional investigative functions will increase financial crime prevention, detection and control capabilities. [14], the different law enforcement agencies lack inter-agency cooperation and collaboration. To breach this gap and introduce a technological based law enforcement agency; is the primary goal of this study. In this new structure, a technological based structure in which information/ knowledge sharing is paramount to law enforcement agencies because failure to share intelligence and information effectively limits the efforts of all states combating crime and this technology will ensure agencies unification and system integration for effective collaboration, synergy in intelligence gathering and agencies cooperation. [15] posits that European intelligence services always emphasize that cooperation between services is a system that works well and does not need improvement. Moreover, cooperation between services may be as old as intelligence itself. Born during the Cold War and reinforced after 11 September 2001, cooperation between the services has been a relatively long lasting, mostly efficient system. One of the reasons for this cooperation, born out of a clear need for borderless intelligence sharing as a response to borderless crime

V. METHODOLOGY

The approach used for the system design is the waterfall model. This is where a project is completed in distinct stages and moved step by step towards ultimate release to consumers. Waterfall approach was chosen because it gives extensive documentation of work, easy to understand, client knows what to expect and it gives a better design [16]. Waterfall model is the first applied software development strategy, resembling the designs that were used in other industries. Waterfall Methodology gives client the right to verify and approve the design at any level before moving to the next level. This methodology can be used to manage big software projects and deliver them at when due. However, [17] depicts that the drawback of waterfall is that it is difficult to accommodate necessary changes, possible and necessary corrections and/or adjustments as the project and its phases unfold. The aim of adopting this methodology is that it will help to unify the five (5) law enforcement agencies in Nigeria for ease of information sharing, collaboration and effective crime management and integrated to hold information about crime suspects, victims and law enforcement agencies. This is shown in figure 1 below

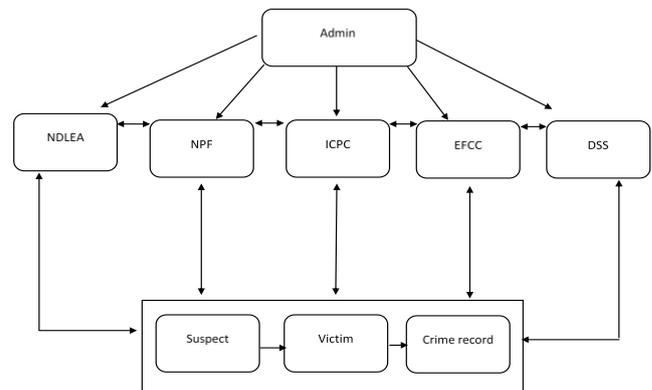


Figure1: Pictorial representation of a unified law enforcement agencies

VI. ANALYSIS OF THE PRESENT SYSTEM

The Law Enforcement agency collects data in a very systematic and thorough manner from the paper-based reports via an Excel file. There is no formal information system, although the Local Intelligence Unit and the Crime Information Office have been very creative and innovative in using Excel to store data, and in producing reports and dashboards via Excel. The data that the police collects in Excel is saved on computers in the Police Department. The Immigration Department of the Police has a database following the computerization of the Border Offices. It was reported that the Police has a traffic information system as well.

A weekly operational summary of the data collected is sent to police stations and to the Police High Command every Monday. An annual summary is presented to the public and the media and transmitted to the Ministry and Statistics Department yearly. All Superintendents have to display crime statistics weekly from their Divisions. Data is normally displayed using a three year comparisons. There is also a monthly Policy Advisory Group of the Police High Command that reviews the crime statistics from the previous month.

The Crime Information Office also provides criminal record certificates to members of the public upon request. Therefore, studies had pointed out that LEAs in Nigeria are opposed in hostility with a demanding situation that has confined the least inherent capacity for coming into being. Hence, the failure of a wholly made system with the aim of working together on a common enterprise to be present time lag in the course of making information to be widely known; lack of crime information data base that functions electronically and data crime capture that is paper-based are factors that inhibits LEA's crime fighting ability. According to [3], the mode of operation of Nigerian Law Enforcement Agencies is most manually based thereby limiting the use of automated system in their operation. An integrated crime management software that automates all common procedures and which will automate every process, workflows, and promote easily sharing of data, information and knowledge within law enforcement agencies, manage documents, enable electronic filings, and help citizens report crime within their environs online

Thus, the demand to choose a fresh elaborate and systematic plan of action and new process of creation resulting from experimentation and study in order to understand and find solution to problems of crime, integrated system has proved its ability of producing intended results towards crime reduction

VII. FUNCTIONAL REQUIREMENTS FOR THE PRESENT SYSTEM

The functional requirements are used to show the functionality of the system and as well verify the performance of the system. In this design, the use case diagram and entity relationship diagram are used to test the functionality of the system

VIII. USE CASE DIAGRAM

This is the graphical representation of user' interaction with the system. It is used for modelling basic flow of events in a use case. In this design, the use case diagram is divided into two (the suspect use case diagram and Agent Use Case Diagram) which is shown in figure 2 and 3 below.

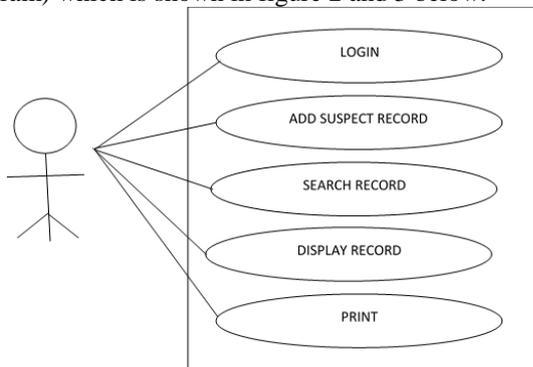


Figure 2: Suspect Use Case Diagram

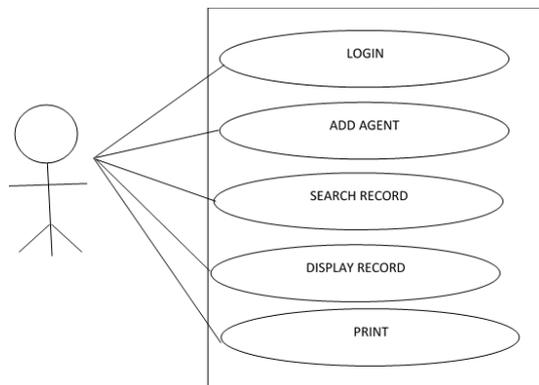


Figure 3: Agent Use Case Diagram

IX. ENTITY RELATIONSHIP DIAGRAM

The relationship of entity sets that are stored in databases are displayed by diagram known as (ER) Diagram. Hence, logical structure of databases are made plan and comprehensible by ER Diagrams. The representation of entity framework infrastructure is the purpose of Entity Relationship Diagram.

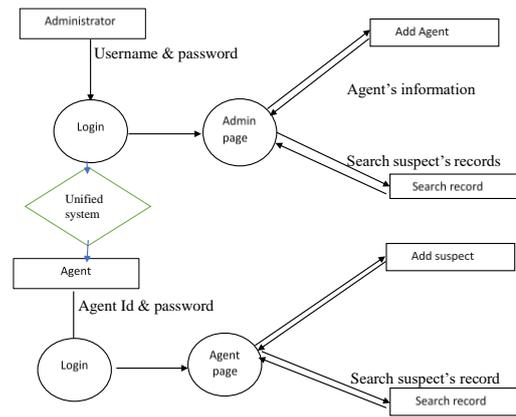


Figure4: Entity Relational Diagram

X. CONCLUSION

With increasing security concerns all over the world and in particular Nigeria where cases of unknown gunmen, banditry, herders and farmers clash are on the rise, it is important that nations/states maintain a comprehensive crime management information system in a positive direction to solve the problems of managing information pertaining to criminals and enable different agencies in information sharing. The law enforcement agencies can utilize the system to retrieve needed information pertaining to crime suspects. This will in turn provide valuable information that will help in tracking down suspects. In managing security concerns in a state, information is very important. If there is a unified crime management information system in our society that integrates these five (5) law enforcement agencies in Nigeria, crime will be reduced, and criminals will always face justice because there will be an effective way of information sharing and collaboration within the agencies rather than what it is today; where all agencies tends to be in isolation with each other. For example, currently in Nigeria, for a person to contest an elective position in government, he/she must pass through DSS screening which is merely on paper. The question is how will DSS identify the person as a petty thief in his village that was arrested some years ago by the police? Hence a successful implementation of this system national security will be enhanced.

Appendix 1: Sample input result

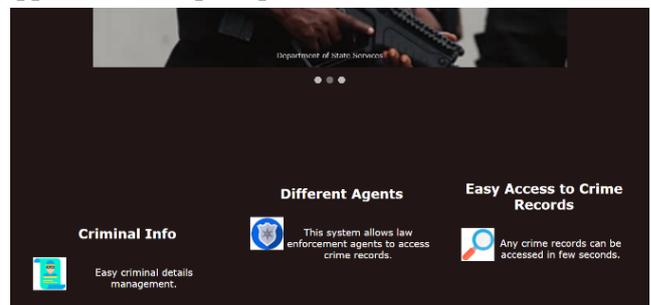


Figure 3: Main Menu Implementation:

This window displays the contents of which all part of the program can be accessed and also contains the welcome page and guide to access different modules of the system.

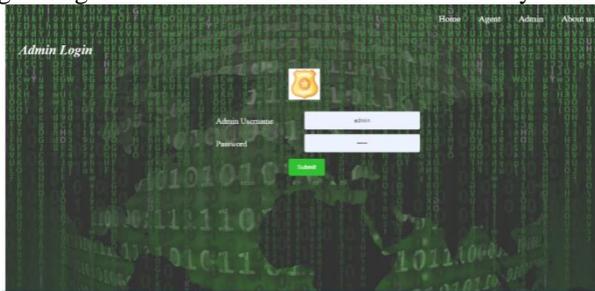


Figure 4: Admin login page:

This module enables the admin to have access to the system in order to create agents and validates user records. The admin is expected to enter his/her user name and password for authentication and validation.

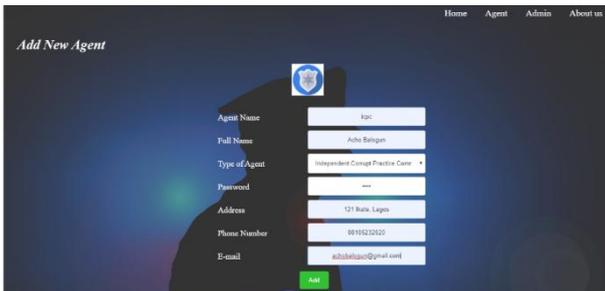


Figure 5: Add New Agent Interface Implementation:

This page allows the admin to create and add new law enforcement agent(personnel) into the system. The system automatically creates new record for the newly added agent depending on the type of agency that the new agent works for. The agents are the users of the system.

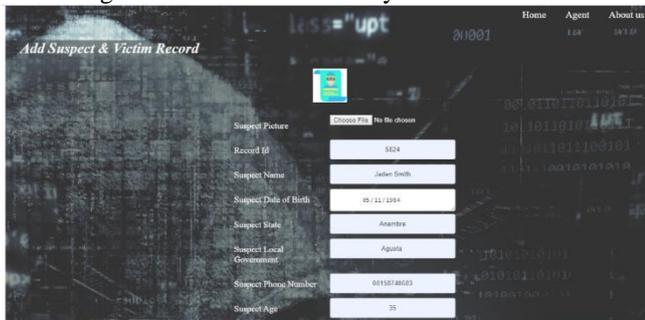


Figure 6: Add Suspects and Victim Record Interface Implementation:

This module adds new suspects and victims to the system with their crime records and other necessary details. The module also captures biometric details of the suspect. After the suspect necessary details are captured, other agencies can have access to such details in future in the case the suspect commits another crime elsewhere.



Figure 7: Search

This module helps the various agencies to quickly search for crime history of suspects either by use identity number, biometrics or other valid means of identification.

Appendix 2: Sample Output Result

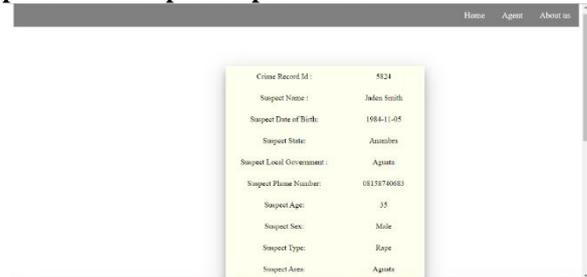


Figure8: Record Display Interface Implementation

This module displays the records of suspect found in the system which includes previous crime (if any) committed by the said suspect and classify the suspect either as first, second or third offender.

REFERENCES

1. A. Crawford and K. Evans, Crime Prevention and Community Safety; The Oxford Handbook of Criminology. Oxford University Press, 797 – 824, (2017) [CrossRef]
2. U. Chikodili, B. Frances and U. Collins, A Hybrid Model of a Collaborative Crime Information System, International Journal of Engineering Research and Technology, 2019, ISSN 0974-3154, Volume 12, Number 8 (2019), pp. 1146-1156
3. A. Makinde, Policing the Niger Delta region. Ibadan: Ibadan University Press, 2017
4. U. U. S Yunus, Nigeria: the Role of Law Enforcement Agencies in Developing New Mechanism in the Fight Against Corruption, 2015, [Online]. Available <http://allafrica.com/stories/201506300436.html> (Current March 2015)
5. M. Addarsh, E. Josh, F. Gab, P. Jones, Q. Chang, W. Robert, Better understanding of crime. 2015, 8(10), 224-226.
6. I. A. Anthony, Social Factors Affecting Effective Crime Prevention and Control in Nigeria, International Journal of Applied Sociology: 3(4),71-72, 2013.
7. Youth crime watch of Nigeria.: A program of African centre for citizens Orientation. [Online].
8. Available:<http://www.ycwnigeria.org/security.html>(Current Oct. 2017)
9. E. Pelumi, O. Oguntunde,,O. Ojo, I. Hilary, O . Okagbue and A. Oguntunde, Analysis of selected crime data in Nigeria, 2018, <https://doi.org/10.1016/j.dib.2018.05.143> 2352-3409/& 2018 The Authors. Published by Elsevier Inc. [CrossRef]
10. B. Rick, Understanding law enforcement information sharing for criminal intelligence purposes, Trends & issues in crime and criminal justice, Trends & issues in crime and criminal justice Australian Institute of Criminology, No. 566, December 2018
11. S. Kaur, and W. Singh, Systematic review of crime data mining. International journal of advanced research in computer science, 8(5), 2017.
12. A. Brown, Understanding law enforcement information sharing for criminal intelligence purposes. Trends and Issues in Crime and Criminal Justice 2018, <https://search.informit.org/doi/abs/10.3316/agispt.20190206006352>
13. J. H. Ratcliffe. Intelligence-led policing, 2nd ed. Abingdon: Routledge, 2016 [CrossRef]
14. E. Kerin, Integrating intelligence and investigation functions within the public regulatory sector to improve financial crime control, disruption, and prevention capability. Journal of the Australian Institute of Professional Intelligence Officers Other Journal Article, 2020,<https://search.informit.org/doi/10.3316/informit.397627625276440>
15. O. Adoyin, and D. E. Agwanwo, Police inter agency collaboration and the provision of security in Nigeria. In D.E. Agwanwo (Ed.), A Political economy of policing in Nigeria, Vol. 2 (pp. 103-120). Makurdi: Aboki Publisher, (2015)

16. N. Labasque, The Merits of Informality in Bilateral and Multilateral Cooperation. International Journal of Intelligence and Counter Intelligence, volume 33 issue (3), 492-498, 2020 <https://www.tandfonline.com/doi/full/10.1080/08850607.2020.1754684> [CrossRef]
17. C., W. Van, The Waterfall Model and the Agile Methodologies: A comparison by project characteristics - short. 10.13140/RG.2.2.10021.50403, 2017.
18. K. Saeedi and A. Visvizi, Software Development Methodologies, HEIs, and the Digital Economy. Educ. Sci. 2021, 11, 73. <https://doi.org/10.3390/educsci111020073> [CrossRef]

AUTHORS PROFILE



Fergus Uchenna Onu, has a PhD in Computer Science, M.Sc in Computer Science and B. Eng in Computer Science and Engineering. He is presently a Senior Lecturer in the Department of Computer Science, Ebonyi State University, Abakaliki. A Fellow of the Nigeria Computer Society (FNCS), and a member Computer Professionals (Registration Council) of Nigeria (CPN). He is the Immediate past Director of ICT/Research Center in Ebonyi State University. He is an ardent researcher in the areas of Computer and data communications, Software and applications development and programming languages. He has to his credit over 60 journal articles published as a result of his continues quest and search for new knowledge.



Mr. Ukabuiro Ikenna K. is a lecturer at Abia State University, Uturu in the department of Computer Science. He holds a Master Degree in Computer Science from Nnamdi Azikiwe University, Awka, Anambra State. He is a Doctorate Degree Student of Ebonyi State University. He has authored so many books. He is married with children.



Douglas A. Kelechi, was involved in the management of the concluded Security Justice and Growth programme of the British Council. Specifically, he served as Knowledge Management Assistant where he was responsible for the implementation programme lesson learning, documentations; production of the various components' newsletters and end of programme information dissemination publications. He has B.Sc in Computer Science, M.Sc in Information Management Technology and presently a PhD Computer Science Student.



Kingsley Maduabuchi Okorie, holds a Ph.D in Computer Science from Ebonyi State University (EBSU), Ebonyi State Nigeria, a Master of Science in Computer Science Nnamdi Azikiwe University (NAU), Awka, Anambra state, Nigeria, a social worker with a master's Degree in Social works from Lagos state University (LASU) Ojo, Lagos state, Nigeria and a Bachelor of Science degree in Industrial Mathematics from Nnamdi Azikiwe University (NAU), Awka, Anambra State, Nigeria. He worked with Nigeria Social Insurance Company (NSITF) as a system analyst and is currently the Director of operations in Eagle Haulage Nigeria.