
**DEPARTMENT OF OPERATIONS AND
MANAGEMENT INFORMATION SYSTEMS**

GLOBAL LEADERSHIP THROUGH A CULTURE OF EXCELLENCE

**PhD
INFORMATION SYSTEMS**

PROGRAMME DOCUMENT

Downloadable at:

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CONTENTS

INTRODUCTION.....	1
JUSTIFICATION FOR THE PHD IN INFORMATION SYSTEMS PROGRAMME	1
GOALS FOR THE PROGRAMME.....	1
OBJECTIVES OF THE PROGRAMME.....	1
ADMISSION REQUIREMENTS	2
APPLICATION PROCESS	2
ENROLMENT STATISTICS	2
STRUCTURE OF THE PROGRAMME	3
CURRICULUM	4
COURSE DESCRIPTIONS.....	5
UGBS 701: PHILOSOPHY OF MANAGEMENT RESEARCH.....	5
UGBS 702: ADVANCED QUALITATIVE RESEARCH METHODS	5
UGBS 703: ADVANCED QUANTITATIVE RESEARCH METHODS	6
OMIS 701: PHILOSOPHY OF INFORMATION SYSTEMS.....	7
OMIS 702: INFORMATION SYSTEMS THEORIES	7
OMIS 704: TRENDS IN INFORMATION SYSTEMS.....	8
OMIS 703: E-BUSINESS TECHNOLOGY & MANAGEMENT	9
OMIS 704: INFORMATION SYSTEMS DEVELOPMENT	9
OMIS 705: MOBILE BUSINESS TECHNOLOGY & MANAGEMENT	10
OMIS 611: DATA MANAGEMENT FOR DECISION MAKERS.....	11
OMIS 612: BUSINESS INTELLIGENCE	12
OMIS 613: ENTERPRISE SYSTEMS AND MODELLING	12
OMIS 614: DATA COMMUNICATIONS AND NETWORKING	13
OMIS 688: SUPPLY CHAIN ANALYTICS*	14
OMIS 690: ARTIFICIAL INTELLIGENCE IN BUSINESS*	15
SEMINARS.....	16
YEAR 2: EXPERIMENTAL LEARNING PROGRAMMES.....	16
PARTICIPATION IN RESEARCH PROJECTS.....	16
SUPPORT SERVICES	19
ADMINISTRATIVE AND ACADEMIC SUPPORT	19
SUPPORT SERVICES FOR INTERNATIONAL STUDENTS	19
PUBLICATIONS BY PHD STUDENTS AND SUPERVISORS	20
JOURNAL PUBLICATIONS BY PHD STUDENTS	20
BOOK CHAPTER PUBLICATION BY PHD STUDENTS	20
CONFERENCE PUBLICATIONS BY STUDENTS.....	20

INTRODUCTION

There is an increasing need for expertise who can research, design and implement contemporary and emerging information systems to address challenges in business, government and business. More importantly, these expertise should be able to teach others to do same. The PhD in Information Systems programme at the University of Ghana Business School responds to these demands with a curriculum that provides participants with the knowledge, skills and competences in the research and teaching of information systems. It provides research training in information systems and management to participants seeking careers in academic and research-oriented institutions.

Justification for the PhD in Information Systems Programme

This emerging information-focused economy has thrown a challenge to the tertiary institutions in Ghana to respond to the need of human capacity to support the adequate exploitation of the technology for socio-economic development. Unfortunately, the Department of Operations and Management Information Systems of the University of Ghana Business School is under staffed and recruiting faculty with the required qualification is challenging since there competition between academia, government, and industry for the few qualified personnel available. A PhD in Information Systems Programme is therefore very essential in order to train graduates who will be able to do research and teach so that they can be retained in the department as faculty. Apart from these graduates being absorbed in University of Ghana, they could also be employed by other tertiary institutions who need their services. The University of Ghana has been playing this role of training lecturers for other tertiary institutions.

Goals for the Programme

The goal of this programme is to equip graduates with the philosophical, critical and analytical skills for researching, teaching and developing sustainable solutions to the opportunities and challenges in adopting, implementing and using information systems in the local communities, firms, institutions in Ghana, Africa and beyond.

Objectives of the Programme

In relation to the above goals, the following objectives are outlined:

- 1) Enable participants to engage in advanced study and research with academic scholars and practitioners in a variety of information systems fields including e-business, e-governance, e-learning, ICT and development, IT policy and strategy, sociomateriality, software engineering, data analytics, and artificial intelligence;
- 2) Provide participants with the knowledge, skills and competence in conducting and publishing original and scholarly research that contributes to all of the fields above and informs practice and policy;
- 3) Provide participants the knowledge and skills to use information systems research to develop sustainable real-world solutions which respond to the needs of communities, organizations, and institutions in the country, Africa and beyond; and
- 4) Provide participants with the competence in developing careers in academic and research institutions or in fields which require the teaching, practice and research on information systems in Africa and beyond.

Admission Requirements

To be admitted into the programme, first, the minimum qualification is a Masters degree in management information systems, Computer Science, Information Studies, or relevant information technology related field from an accredited university. Applicants who have a Masters degree from an accredited university and have a relevant experience (not less than 2 years) in working in an information systems or information related field are also considered. Second, the applicant must be a holder of a first degree from an accredited university. The first degree should be a minimum of second class lower division. Applicants who satisfy these requirements will be short-listed and interviewed to select the best for the programme.

Application Process

PhD IS application is open year round. However, there are two admission intakes: January and August. The application process begins online. There is a dedicated admissions website for postgraduate programmes: <http://admission.ug.edu.gh/>

International applicants are expected to pay to the University a non-refundable application processing fee of US\$110.00. Payment can be made online. Ghanaian nationals are required to buy an e-voucher from a local bank and continue the process through an online application form. Upon the above payments the applicant continue through an online application form:

<http://admission.ug.edu.gh/applying/postgraduate/apply-now-post-graduate-admissions>

The documents to be scanned and uploaded online are: first and second degree certificates and transcripts; and PhD Research Proposal. The details of the three referees should also be provided. Applicants who satisfy the admission requirements will be short-listed by Host Department (in April for August Admission and in October for January Admission) and interviewed to select the best for the program. Students will be required to do a presentation of their PhD proposal in-person or through video-conferencing (e.g Skype). During the interview, students' ability to pay the prescribed fees would also be verified. Students are scored over 100 points and best students (scoring above 70 percent) and fit of research interests are selected per availability of supervisors. Applicants are advised to contact a potential supervisor before applying. Students are notified of admission status online through the admission platform. The online admission applications system is only in English.

Enrolment Statistics

Year	Year 2012/13	Year 2013/14	Year 2014/15	Year 2015/16	Year 2016/17	Year 2017/18	Year 2018/19
Male		2	1	1	8	10	5
Female		0	1	0	0	5	1
Total		2	2	1	8	15	6

Structure of the Programme

The duration of the programme is four years for a full-time and six years for a part-time program. The first year is a course work period, in which the students develop qualitative and quantitative skills, an understanding of philosophy and theories of information systems and knowledge in contemporary topics such as business intelligence and trends in the design, development, implementation, usage and impact of information systems.

The second year consists of a comprehensive examination and experiential learning program. The comprehensive examination is completed in the first six weeks of the second year and students are required to conduct a literature review on a contemporary research area, write a research paper based on a gap identified in the research area and a present these papers to his or her PhD committee (consisting of 2 to 4 supervisors). Upon passing the comprehensive examination, the students progress to the experiential learning program. The experiential learning programme focuses on guiding students to put theory into practice by engaging in supervised research projects that will require them to apply the theories and skills they have acquired into gathering data, analysing them, writing reports, and presenting them at academic seminars, conferences and workshops. The students are mentored to expand their comprehensive examination research papers and publish them through conferences and journals. The students are also placed with industry partners and government agencies to conduct research and develop solutions relevant to a specific research area. By the end of the experiential learning, the student should have been able work with the PhD Committee to develop a research proposal, literature review, methodology and preliminary data analysis reports in a specific research area towards the PhD program. In the third and fourth years, the student are supervised to complete the PhD research by completing the writing of the respective chapters, publishing in reputable journals and presenting research works at reputable conferences.

To complete the PhD, students are required to pass all required courses in year one, the comprehensive examination, four departmental PhD seminars, the thesis examination (marking of thesis by two external examiners and one internal examiner and a public defense with the examiners). Per the University regulations, students have the option of undertaking the PhD by writing a monograph or by publication of papers. However, within the OMIS department, PhD IS students are only able to submit the thesis for examination after publishing at least one paper in a Scopus/Web of Science Indexed Journal and two conference papers at relevant IS conferences (Association of Information Systems, Association for Computing Machinery and Institute of Electrical and Electronics Engineers). The department encourages students with the mantra that, a thesis with published outputs is more likely to be passed. The Graduation Requirements are the attainment of Course Work: 18 – 27 credits; PhD Seminars: 12 credits and Thesis: 45 credits. **The degree to be awarded upon successful completion of the graduation requirements is PhD Information Systems.**

CURRICULUM

Courses	Credit
Year 1	
Semester I	
UGBS 701: Philosophy of Management Research	3
UGBS 703: Advanced Quantitative Research Methods	3
OMIS 701: Philosophy of Information Systems	3
Elective (Choose One)	
OMIS 703: E-Business Technology & Management	3
OMIS 705: Mobile Business Technology & Management	3
OMIS 611: Data Management for Decision Makers	3
OMIS 613: Enterprise Systems and Modelling	3
Total Credits	12
Semester II	
UGBS 702: Advanced Qualitative Research Methods	3
OMIS 702: Information Systems Theories	3
OMIS 704: Information Systems Development	3
OMIS 706: Trends in Information Systems	3
Electives (Choose One)	
OMIS 612: Business Intelligence	3
OMIS 614: Data Communications and Networking	3
*OMIS 688: Supply Chain Analytics	3
*OMIS 690: Artificial Intelligence in Business	3
Credits	12-15
Total Credits	24-27
Year 2	
Semester I	
OMIS 710: Seminar I: Proposal	3
Semester II	
OMIS 720: Seminar II: Experiential Research Learning	3
Total Credits	6
Year 3	
Semester I & II	
OMIS 730: Seminar III: Initial Progress Report	3
	-
Total Credits	6
Year 4	
Semester I & II	
OMIS 740: Seminar IV: Interim Progress Report	3
	-
Semester II	
OMIS 700: Final Thesis Submission	45
Total Credits	75-78

* New courses being introduced throughout MBA Operations Management and Logistics and Revised MBA MIS Programme for all students in the department including PhD Information Systems.

COURSE DESCRIPTIONS

UGBS 701: Philosophy of Management Research

Aim and Objectives: This course aims to introduce contemporary debates that surround various philosophical paradigms in management research and the rationale for choosing an appropriate one. The objectives are to equip students with the knowledge of trends in philosophical debates and enable to develop the practice in arguing academic perspectives in presentations and academic writings.

Learning Outcomes: At the end of the course, students should understand the trends of philosophical debates in their respective disciplines. They should also be able to explain research paradigms in social sciences and business studies and be able apply research paradigms to their research interests. They should be able to assess the different approaches to argumentation and apply them in academic writing.

Content: Topics to be covered include subjectivity/objectivity, inductive/deductive arguments, scientific method/social constructivism, ontological and epistemological perspectives in management research, positivist paradigm, interpretive paradigm, critical paradigm, argumentation and criteria for evaluating research under each of these paradigms. It will be delivered through seminar presentations, readings and academic debates.

References:

1. Easterby-Smith, M., Thorpe, R. and Jackson, P.R. (2012). *Management Research*. SAGE Publications.
2. Kakabadse, N., & Kakabadse, A. (2012). *Philosophy for Management Research*. London: Routledge.
3. Kaldis, B. (2013). *Encyclopedia of Philosophy and the Social Sciences*. Sage Publications.
4. Little, D. (2016). *New Directions in the Philosophy of Social Science*. Rowman & Littlefield International.
5. Rosenberg, A. (2015). *Philosophy of Social Science 5th Edition*. Westview Press.

UGBS 702: Advanced Qualitative Research Methods

Aim and Objectives: The course aims at introducing students to qualitative research and mentoring them to distinguish between the theoretical basis for and key features of the qualitative methodologies; comprehensively review extant literature to establish research gaps; identify, adapt, develop, justify and apply theories/research frameworks to a research project; collect, analyse and writeup; and assess reliability and ethics of qualitative studies and discuss transferability of results.

Learning Outcomes: At end of the course, students should be able to conduct a comprehensive synthesis of literature in their research discipline, develop a research proposal and collect and analyse data using an appropriate qualitative methodology.

Content: The topics to be covered include: literature synthesis and review; principles for designing, conducting, and appraising studies using the main qualitative methodologies; theory development and application; sampling; interviewing techniques; archival research; focus groups discussion; content analysis; participant

observation; case study, elite interviews; computerised qualitative analysis (Nvivo 9.1); data analysis techniques; and writing up.

References:

1. Boateng, R. (2016). *Research Made Easy, Limited Edition*. Charleston, USA: Create Space Independent Publishing (an Amazon Company).
2. Creswell, J. W. (2013). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. SAGE Publications, London
3. Fisher, C. (2010). *Researching and Writing a Dissertation, An Essential Guide For Business Students*, Pearson Education Limited, Essex.
4. Neuman, W.L., and Robson, K. (2014). *Basics of Social Research: Qualitative and Quantitative Approaches, 3rd Edition*, Pearson Education, Canada.
5. Yin, R. K. (2012). *Applications of Case Study Research, 3rd Edition*, SAGE Publications.

UGBS 703: Advanced Quantitative Research Methods

Aim and Objectives: The course aims at equipping students with the strategies and tools of how to develop statistical models that are tailored to answer their research questions. The objectives are to equip students with the knowledge of the theoretical underpinnings of statistical methods and how they apply to research questions. They will also develop the practice of using statistical tools in data analysis and interpretation using computer packages; ethical issues in research; and reporting research results.

Learning Outcomes: At the end of the course, the students should have a conceptual understanding of the statistical methods studied in the course and be able to apply them to management research issues. They should be able to interpret the results of statistical analyses and to effectively report results to the understanding of non-statistical audience. They should also be able to conduct statistical analyses using Excel, SPSS, R, AMOS and Stata.

Content: It covers topics including a review of elements in the research process, an overview of multivariate methods, screening data for missing values and normality, hypothesis testing, exploratory factor analysis, multivariate analysis of variance (MANOVA), multiple regression analysis, discriminant analysis, logistic regression, and structural equation modelling.

References:

1. Greene, W. H. (2011). *Econometric analysis*, 7th Edition. New Jersey: Prentice Hall
2. Albright, S. C., and Winston, W. L. (2016). *Business Analytics: Data Analysis and Decision Making with Microsoft Excel, 6th Edition*, Cengage Learning.
3. Hair, J., Anderson R.E., Black B., and Babin B. (2016). *Multivariate Data Analysis, 7th Edition*, Pearson Education.
4. Johnson, R.A., and Wichern, D.W. (2013). *Applied Multivariate Statistical Analysis, 6th Edition*, Prentice-Hall.
5. Enders, W. (2009). *Applied econometric times series: Wiley series in probability and statistics*. London: John Wiley Sons Inc.

OMIS 701: Philosophy of Information Systems

Aim and Objectives: This course aims to introduce students to contemporary debates on different philosophical perspectives in information systems research and the rationale for justifying their appropriateness. The objectives are to discuss the ontological, epistemological, methodological and axiological perspectives of the major philosophical perspectives in information systems research. It will also expose students to the trends in information systems research and how these trends shape philosophical debates in the discipline.

Learning Outcomes: At the end of the course, the students should understand IS philosophy and be able develop a research design on how to apply a specific research philosophy to an information research issue.

Content: It covers topics including ontology, epistemology, methodology, axiology and evaluation principles of positivist, interpretive, critical and pragmatic philosophy in information systems research.

References:

1. Cater-Steel, A. and Al-Hakim, L. (2009). *Information systems research methods, epistemology, and applications*. Hershey, PA: IGI Global.
2. Myers, M., D. & Avison, D. (Eds.) (2002). *Qualitative research in information systems: A reader*. London: Sage Publications.
3. Oates, B. (2006). *Researching information systems and computing*. London: Sage Publications.
4. Mingers, J & Willcocks, L.P (2004). *Social theory and philosophy for information systems*, Chichester: Wiley.
5. Rosenberg, A. (2015). *Philosophy of Social Science 5th Edition*. Westview Press.

OMIS 702: Information Systems Theories

Aim and Objectives: This course aims at examining the advanced theoretical foundations, models and frameworks development in information systems research. It will discuss trends in the development, application and evaluation of theories in information systems research projects. It will also expose students to evaluation principles for the appropriateness and usefulness of common theories under major the research paradigms.

Learning Outcomes: By the end of the course, students should be able identify and conduct a comprehensive review of theories relevant to their research area. Students should be able to identify gaps in current research frameworks or theories and develop a research proposal to address these gaps.

Content: The topics to be discussed include classification of information systems theories – by application to the information lifecycle (need, design, development, adoption and implementation), by maturity and by research issue/focus. It would also discuss research gaps in dominant and emerging theories and explore different research approaches to develop and test theories.

References:

1. Boateng, R. (2016). *Research Made Easy, Limited Edition*. Charleston: Create Space Independent Publishing (an Amazon Company).
2. Dwivedi, Y.K., Wade, M.R., & Schneberger, S.L. (2012). *Information systems Theory: explaining and predicting our digital society*. Vol. 1-2, S. Boston, MA: Springer.
3. Kaplan, B., Truex III, D., Wastell, D., Wood-Harper, T. and DeGross, J. (Eds.) (2004), *Information systems research: Relevant theory and informed practice*, Norwell, MA; Kluwer.
4. Walsham, G. (1993). *Interpreting information systems in organizations*, Chichester: John Wiley and Sons.

OMIS 704: Trends in Information Systems

Aim and Objectives: The course aims at examining the past and emerging technologies and their implications for industry, research and society in general. It will deal with historical, current and future trends in information systems/information technology research and practice from mainframe, to mini, micro, desktop and mobile/ubiquitous computing. The course will also discuss the fusion of information and communication technologies through networking innovation spawned by the Internet and their impact on co-shaping relationships between organisations and technology.

Learning Outcomes: At end of the course, the students should be able to assess new and emerging technologies and discuss their impact to business and information systems strategies. The students should also be able to examine the unintended consequences on new and emerging technologies and their related social and legal implications in business and the society.

Content: Topics to be covered include: trends in technological developments, hardware and operating systems, software development tools and processes, relational databases, security and cryptography, virtualization, clouding computing, enterprise applications, electronic commerce, cybercrime, internet of things, big data, social media analytics and mobile broadband technologies. It will be delivered through seminar presentations, readings and academic debates.

References:

1. Oslon, D.L. and Kesharwani, S. (2009). *Enterprise information systems: Contemporary trends and issues*. Hackensack, NJ: World Scientific Publishing Company.
2. Siau, K. (2011). *Theoretical and practical advances in information systems development: Emerging trends and approaches*. Hershey, PA: IGI Global.
3. Teuteberg, F. and Gomez, J.M (2010). *Corporate environmental management information systems: Advancements and trends*. Hershey, PA: Business Science Reference.
4. Zgrzywa, A., Choros K. and A. Sieminski (2008). *New trends in multimedia and network information systems*. Amsterdam: IOS Press.

OMIS 703: E-Business Technology & Management

Aim and Objectives: This course focuses on e-business innovation from technological, managerial and organisational perspectives. It will discuss theoretical and practical trends relating to the development and exploitation of e-business technologies and their applications in modern organisations in the global network economy. It will also expose students to e-business development in both start-ups and established organisations.

Learning Outcomes: At the end of the course, students should be able assess the business models of companies and technology start-ups and relate them with the theoretical models. Students should also be able to design strategic plans to determine and sustain the creation of value among e-business enterprises.

Content: The topics to be covered include: digital economy, e-business technologies, e-business models and strategies, e-business start-ups, e-business transformations in established organisations, e-government, e-commerce channels, value-creation, e-business environments and security issues. It will be delivered through seminar presentations, readings and a case study project on a technology startup.

References:

1. Bocij, P., Greasley, A. and Hickie, S. (2008). *Business information systems: Technology, development and management for the e-business*. London: Pearson.
2. Chaffey, D. (2011). *E-business and e-commerce management*. London: Pearson.
3. Gloor, P., (2012). *Making the e-business transformation*. Boston, MA: Springer.
4. Napier, A., Judd P. and Rivers, O. (2002). *E-business technologies*. London: Course Technology.
5. Reynolds, J. (2009). *E-business: A management perspective*. Oxford: Open University Press.

OMIS 704: Information Systems Development

The course aims at explaining how design and development problems are conceived, researched, analyzed and resolved in different types of organizations and contexts, including start-ups, enterprises with legacy-systems, non-profit and government entities. The objectives of the course are to enable students understand the role of context in IS development and explain how social systems shape IS development processes.

Learning Outcomes:

At the end of the course, students should be able to: assess different approaches to systems analysis and design to develop systems/applications for the web, mobile and other new platforms like wearable devices, and internet of things. The student should able to assess, design and develop an information systems application to address a real-world challenge/need/problem in a firm or organization.

Content: Students will learn about systems development life cycle, systems analysis and design techniques (process modelling, logical modelling) data modelling, object-oriented modelling, and the use of MS project management tools. The laboratory component of this course will require the use of Android software development kit (mobile applications), MS Access, MySQL and Joomla Content Management System to give students hands-on experience in developing solutions to database problems.

References

1. Avison, D. and Fitzgerald, G. (2006). *Information Systems Development: Methodologies, Techniques and Tools – 4th Edition*, London: McGraw-Hill.
2. Bennett, S., McRobb, S. and Farmer, R. (2010). *Object oriented systems analysis and design using UML*, 4th Ed, New York, NY: McGraw-Hill.
3. Kendall, K. and Kendall J.E. (2014). *Systems Analysis and Design*, 9th edition. NJ: Pearson.
4. Rob, P. And Coronel, C. (2014). *Database Systems – Design, Implementation and Management – 11th Edition*, Course Technology, Cengage Learning.
5. Valacich, J. S. and George, J. F. (2016). *Modern Systems Analysis and Design*, 8th Edition, NY: Pearson.

OMIS 705: Mobile Business Technology & Management

Aim and Objectives: The course entails the mobile business concepts, business models, challenges, applications and technologies from a managerial perspective. The course will cover the emerging and existing mobile business models and their strategies for value creation. It will also discuss the different mobile network technologies, standards and protocols. Students will also learn about mobile internet, mobile security and techniques for developing mobile web applications. It will also expose students to mobile applications in marketing, procurement, finance and sales.

Learning Outcomes: At the end of the course, students should be able to: assess different mobile operating systems and determine their design requirements. The student should be able to assess, design and develop a mobile application to address a real-world challenge/need/problem in a firm or organization. They should also be able to design and implement a strategy to test the mobile application and commercialise the application through online application stores, where possible.

Content: Topics to be covered include mobile platforms and applications, mobile business models, mobile adoption, mobiles and social media, mobile web applications, mobile security, mobile financial services, mobile design and development, and ethics and social issues in mobile businesses. The laboratory component of this course will require the use of Android software development kit (mobile applications), Java, MySQL and Joomla/Wordpress Content Management System to give students hands-on experience in developing solutions to database problems.

References:

1. Andersson, C., Freeman, D. James, I., Johnston, A. and Ljung, S. (2006). *Mobile media and applications, from concept to cash: Successful service creation and launch*. Chichester: Wiley.

2. Bouwman, H., de Vos, H. and Haaker, T. (2010). *Mobile service innovation and business models*. Heidelberg: Springer.
3. Sorensen, C. (2011). *Enterprise mobility: Tiny technology with global impact on work*. New York, NY: Palgrave Macmillan.
4. Deltina, H. (2009). *A survival guide to social media and web 2.0 optimization: Strategies, tactics, and tools for succeeding in the social web*. Austin, TX: Dalton Publishing.
5. Layon, K. (2012). *Mobilizing web sites: Strategies for mobile web implementation*. Berkeley, CA: Peachpit Press.
6. Sugai, P., Koeder, M. and Ciferri, L. (2012). *The six immutable laws of mobile business*. Hoboken, NJ: Wiley.

OMIS 611: Data Management for Decision Makers

Aim and Objectives: The course aims to introduce students to modern data and decision making needs for managers (potential) at both public and private organizations. The objectives are to equip students with advanced skills needed to design, develop and use database, data warehousing and data mining systems for effective decision support.

Learning Outcomes: At the end of the course, student should be equipped to understand, apply and use data analytics tools and techniques to analyse data and inform decision making in organizations. The student should also be able to develop data management plan and policies for organizations.

Content: First phase of topics to be covered will include: data integration, data migration and synchronization, data quality standards as well as data and system security, privacy-and assurance models for protecting digital assets. The second phase of topics will focus on business analytics modelled on the Cross-Industry Standard Process for Data Mining. Here topics to be covered will include: structured and unstructured datasets, predictive, classification and clustering analysis and how these techniques are used to extract knowledge and intelligence in real-world datasets. In addition, students will also learn how to extract social media data for sentiment analysis. Datasets will be drawn from many fields such as marketing, finance, production, health, education and public administration in practical analytics sessions that support management decisions. Software to be used include RapidMiner, R for Statistical Computing, and Tableau.

References

1. Blazewicz, J., Kubiak, W., Morzy, T., and Rusinkiewicz, M. (eds.) (2003), *Handbook on Data Management in Information Systems*, Springer.
2. Kimball, R., & Ross, M. (2013). *The data warehouse toolkit: The definitive guide to dimensional modeling*. John Wiley & Sons.
3. Provost, F., & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking*. O'Reilly Media, Inc."
4. Sherman, R. (2014). *Business Intelligence Guidebook: From Data Integration to Analytics*. Newnes.
5. Witten, I. H., & Frank, E. (2005). *Data Mining: Practical machine learning tools and techniques*. Morgan Kaufmann.

OMIS 612: Business Intelligence

Aim and Objectives: This course aim to introduce students to the design of faster, richer and intelligible real-time reports to augment management decisions and policies. The objectives are to equip student with both the managerial and the technological strategies used to collect, visualize and analyse data for a wide array of management tasks. Special attention will be given to hands-on practices that involve technologies and tools used to create business intelligence (BI) dashboards.

Learning Outcomes: After completing this course, students will be able to: differentiate between decision support systems (DSS), data analytics and business intelligence (BI); explain and apply techniques in data mining, neural networks, text analytics, text mining, sentiment analysis, web mining, web analytics, social analytics, and social network analysis; and apply big data technologies in business intelligence using social networking, Web 2.0, and cloud computing. The students should also be able to assess the key ethical and legal issues of analytics.

Content: Students will learn foundational knowledge of business needs, data understanding and preparation as well as interpreting and deploying results. Through discussions, case studies and presentations, students will also learn about ethical, behavioural and legal concerns regarding the use of data and its subsequent interpretations. Practical sessions in this course will involve how to load/access data from a number of sources (databases, local repositories, the cloud, Microsoft Azure etc.), clean data, visualize create real-time dashboards and deploy them for management decisions. Software to be used include Microsoft PowerBi and Tableau.

References

1. Sharda, R., Delen, D., Turban, E., Aronson, J., & Liang, T. P. (2014). *Business Intelligence and Analytics: Systems for Decision Support*. Prentice Hall.
2. Sherman, R. (2014). *Business Intelligence Guidebook: From Data Integration to Analytics*. Newnes.
3. Sharda, R., Delen, D., & Turban, E. (2013). *Business Intelligence: A Managerial Perspective on Analytics*. Prentice Hall Press.
4. Boyer, J., Frank, B., Green, B., Harris, T., & Van De Vanter, K. (2010). *Business Intelligence Strategy: A Practical Guide for Achieving BI Excellence*. Mc Press.

OMIS 613: Enterprise Systems and Modelling

Aim and Objectives: This course aims to provide students with knowledge of enterprise resource planning systems (ERP), with a focus on the management, organizational and technological strategies needed in ERP implementation. The objectives are to enable students gain the knowledge and practice of enterprise system critical success factors that lead to effective ERP implementation. Students will also learn a number of decision-making strategies such as making a business case for the adoption of ERPs in organizations and selecting ideal ERP vendors and modules.

Learning Outcomes: At the end of the course, students will equipped to identify and apply the basic principle and components of enterprise modelling; and apply appropriate tools and methods in modelling enterprise architecture and information system. As end-user, students should be able to configure and perform common

business transactions within a typical integrated business processes in an ERP, such as procurement, production, and fulfilment.

Content: Topics will include systems thinking, architecture of Integrated Information System, business process design and re-engineering, enterprise content management, Business value of ERP modules, managing data in ERPs, ERP organizational structures and culture, and ERP workflow tools. Students will be introduced to a number of typical Enterprise Systems modules such as customer relationship management (CRM), human resource (HRM), financials and controlling (FICO), materials management among others. The laboratory component in the course will equip students with advanced modelling skills in cross-functional business processes using modern industry-wide software tools as well an exposure to a real-world organizational use of ERP software. Software to be used include ARIS Express (business process management) and Dolibarr ERP.

References

1. Jolly, R. (2015). *Systems Thinking for Business: Capitalize on Structures Hidden in Plain Sight*. Portland, OR: Systems Solutions.
2. Laguna, M., and Marklund, J. (2013). *Business process modeling, simulation and design*. CRC Press.
3. Magal, S. R., and Word, J. (2011). *Integrated business processes with ERP systems*. Wiley Publishing.
4. Motiwalla, L. F., and Thompson, J. (2012). *Enterprise systems for management* Boston, MA: Pearson.
5. Sharp, A., & McDermott, P. (2009). *Workflow modeling: tools for process improvement and applications development*. Artech House.

OMIS 614: Data Communications and Networking

Aim and Objectives: The aim is to enable students gain a management level overview of the fundamental technical concepts, knowledge and terminologies essential for an understanding of telecommunications technology and computer networks for data, voice, image and video communications, including wireless and Internet communications. The objectives are to enable students understand fundamentals of data communications, packet transmission in networks, and LAN and WAN technologies and topology. Students will also learn about the concepts and protocols of internetworking, and be able to apply techniques for data integrity and security.

Learning Outcomes: Students will be equipped with the understanding of the technology and control mechanisms underlying local area and wide area networks including wireless networks, the fundamentals of information transmission and coding, the protocols that allow diverse networks to interoperate, the role of data buffering and sources of data loss. They also will be able to control the path and flow of data such that network performance is enhanced (routing and congestion control), special problems arising in high bandwidth networks, what Internet traffic actually looks like, key issues surrounding multimedia communication (voice/audio/video), and their support (quality of service).

Content: Through case studies, simulations and illustrations, an overview of network topologies for the essential of Local Area Network (LAN), Metropolitan Area Network (MAN), and Wide Area Network (WAN) will be discussed. In addition, students will be

introduced to network security, privacy, authentication and their policy implications from management perspectives should be examined.

References

1. FitzGerald, J. and Alan, D. (2014). *Business Data Communication and Networking*, 12th Edition. Wiley.
2. Forouzan, B. (2012). *Data Communications and Networking 5 Edition*. Science Engineering & Math.
3. Kurose, J. F., and Keith W. R. (2013). *Computer Networking: a Top-Down Approach. 6th edition*. Boston: Pearson.
4. Peterson, L.L. and Davie, B.S. (2011). *Computer Networks, Fifth Edition: A Systems Approach (The Morgan Kaufmann Series in Networking)*. 5 edition Morgan Kaufmann.

OMIS 688: Supply Chain Analytics*

Aim and Objectives: Effective operations and logistics management requires analysis of both customer and supplier data. The approach to this course is a hands-on analysis of various supply chain functions and how to analyze data available in the supply chain. Analysis is an essential part of the tactical and strategic decisions of organizations. The course will give students knowledge in business analytics relevant in other functional areas.

Learning Outcomes: At the end of the course, students are expected to identify various types of data, aggregate functional data in ways that provide meaning and develop plans for the improvement of supply chain activities of the organization. Student should be able understand the basics of modelling using software tools including R Language.

Content: Through case studies, simulations and illustrations, students will learn about Business Analytics and Optimization; analysing the level of uncertainty associated with the supply of products and services to targeted customer segments and justifying the choice of a supply chain strategy; understand the role and applications of

Reading List

1. Albright, S. C., & Winston, W. L. (2015). *Business Analytics: Data Analysis and Decision Making* (5th ed.). CA: South-Western College.
2. Feigin, G. (2011). *Supply Chain Planning and Analytics: The Right Product in the Right Place at the Right Time*. NY: Business Expert Press.
3. Jacobs, F. R., & Lummus, R. (2014). *The Supply Chain Professional: Concepts and Analytics*. Naperville: Hercher Publishing.
4. Nagurney, A., Masoumi, A. H., & Nagurney, L. S. (2013). *Networks Against Time: Supply Chain Analytics for Perishable Products*. NY: Springer Science and Business Media.
5. Sanders, N. R. (2014). *Big Data Driven Supply Chain Management: A Framework for Implementing Analytics and Turning Information Into Intelligence*. NJ: Pearson Education.
6. Watson, M., Lewis, S., Cacioppi, P., & Jayaraman, J. (2012). *Supply Chain Network Design: Applying Optimization and Analytics to the Global Supply Chain*. NJ: FT Press.

OMIS 690: Artificial Intelligence in Business*

Aim and Objectives: The course seeks to introduce students to the basics of Artificial Intelligence (AI) and how AI is applied for business. The course will teach students the mathematical and programming background of how the most common Machine Learning (ML) algorithms work, specifically focused around how to predict scores, classes, and clusters from data. The course enable students to apply AI to Customer Service, Sales, and Marketing. It will explore real-world case studies where AI produced measurable return on investment in business across different industries. Beyond industry is will also explore the application of AI in the business of non-governmental and public sector institutions such as education, finance, agriculture, security and health administration.

Learning Outcomes: At the end of the course student will have the knowledge, skills and competence to develop an AI solution that has a significant business value. Student should be able understand the basics of developing AI solutions through software tools including Python.

Content: Through case studies, simulations and illustrations, students will learn about introduction to AI; AI for customer service, sales, and marketing; AI for Public Sector and Non-governmental Institutions; Deep Learning; Python Programming; Bayesian Networks; Implementation of AI Solutions; Ethical and Legal issues in AI.

Reading List

1. Russell, S. & Norvig, P. (2010). *Artificial Intelligence: A Modern Approach*. 3rd Edition, Boston: Prentice Hall.
2. Finlay, S. (2017). *Artificial Intelligence and Machine Learning for Business: A No-Nonsense Guide to Data Driven Technologies*. 2nd Edition, USA: Relativistic.
3. Geron, A. (2017). *Hands-On Machine Learning with Scikit-Learn and TensorFlow Concepts, Tools, and Techniques to Build Intelligent Systems*. USA: O'Reilly Media
4. Broad background resource: AI Topics: <https://aitopics.org/search>

*** New courses being introduced throughout MBA Operations Management and Logistics and Revised MBA MIS Programme for all students in the department.**

SEMINARS

Regular seminars are planned for PhD students at various stages of the programme to present their proposal, research experience, work-in-progress and final thesis report as follows:

OMIS 710: Seminar I

During Seminar I, students will present their PhD proposal.

OMIS 720: Seminar II

During Seminar II, students will present on their experience and lessons gained from internship/experiential learning

OMIS 730: Seminar III

During Seminar III, students will present on their initial thesis progress report.

OMIS 740: Seminar IV

During Seminar IV, students will present on their interim thesis progress report.

YEAR 2: EXPERIMENTAL LEARNING PROGRAMMES

The activities of the second-year PhD programmes are geared towards guiding students to put theory into practice by engaging in research projects that will require them to apply the theories and skills they have acquired into gathering data, analysing them, writing reports, and presenting them at academic seminars, conferences and workshops. Students will also be guided to acquire specific techniques and expertise in the design, conduct and evaluation of research activities as well as literature reviews and development of methodologies to be used in their PhD research. The various activities will help them to be well-grounded in various research activities.

Seminar/Conference Participation

Students will be required to participate in and present papers individually, in teams, or jointly with faculty at departmental seminars, UGBS conferences, seminar series and doctoral consortia as well as credible international information systems conferences and workshops such as ICT for Africa (ICT4A), International Conference on Information and Communication Technologies and Development (ICICTD), International Conference on Information Systems (ICIS), European Conference on Information Systems (ECIS), UK Academy of Information Systems (UKAIS), and Americas Conference on Information Systems (AMCIS). Through such forums, students will have the opportunity to interact with senior academics who can serve as their mentors and other PhD students for academic networking.

PARTICIPATION IN RESEARCH PROJECTS

In addition to the general activities outlined above, students will be engaged in on-going research projects in the departments, including the following:

A: Examining the Contextual Critical Success Factors for Intelligent Systems Implementation in Ghanaian Organizations (PI: Dr. Owusu and Prof. Boateng)

The use of intelligent systems to analyze and get insights into big data for making informed decision abounds in the developed world. Thus, most organizations in these countries through descriptive, diagnostic, predictive, and prescriptive analytics systems

with dashboards showing various metrics/KPIs are able to get knowledge about the strength of their businesses, thereby curtailing any foreseeable dangers that may affect their existence. However, the same cannot be said about developing economies in Sub-Saharan Africa especially Ghana. Most organizations across all industries continue to rely on their Transaction Processing Systems (TPS)/Management Information Systems (MIS) without much data analytics. As such, decision making is sometimes based on disparate traditional reports coming from these systems which may be difficult to read and interpret. This study aims to solve this problem by exploring the factors that can influence the diffusion of intelligent systems in Ghanaian industries. Using multiple case study approach, the research will seek the Contextual Critical Success Factors (CCSFs) to aid in the planning, designing, implementation, deployment and evaluation of intelligent systems for various industries in Ghana. The outcome of this research is aimed at providing a framework which will be a template for implementation of intelligent systems in Ghanaian firms.

B: Organizational Learning and Web 2.0 (Prof. Boateng)

This research explores how web 2.0 technologies can support learning in an organizational context. Previous work has explored how link between employee learning and organizational learning and also learning supportive features of Web 2.0. Future work, which is useful for students, include the use of social media to support learning activities in organizations and business value creation through social media. The student will gain opportunity of learning how to use content analysis as a qualitative research technique to study content on online platforms.

C: Electronic Business for Business and Development (Co-PIs: Prof. Effah and Prof. Boateng)

This research seeks to understand how firms in developing countries deploy and manage their resources to navigate the constraints of their context and achieve e-commerce/e-business benefits. This research also explores how the interrelationships between technology and non-technology actors in the design and use of e-business. Current work has reviewed a number of e-business case studies and literature using technology adoption models, soci-technical theories, and the resource-based theories. The work has covered themes including cybercrime, e-business strategy, e-banking and development. Students will gain opportunity of using both qualitative and quantitative research methods to develop an empirical understanding of the conduct of e-business in Ghana.

D: Electronic Banking Implementation in Ghana (Co-PIs: Prof. Effah and Prof. Boateng)

This is an ongoing project which seeks examine efforts by the Bank of Ghana and other stakeholders in the banking industry in Ghana to establish an enabling environment for the conduct of e-banking. The study focuses on projects including the Ghana Interbank Payment & Settlement Systems (GhIPSS) and internet banking technologies in retail banking. Students will gain opportunity of using qualitative data techniques to develop descriptive case studies explaining the process of implementation of these banking technologies.

E: Process Virtualization in Higher Educational Institutions (PI: Prof. John Effah)

This research explores the attempt by higher educational institutions in Ghana to migrate from manual/paper-based processes to virtual process environments where communication, activities, interactions, and collaborations are mediated by multi-media computer networks including mobile, internet, intranet, extranet and web technologies. The current phase of the project is focusing on participatory action

research on University of Ghana's Chinese Phase II ICT Project aiming to transform the institution to a virtual academic and administrative environment. The participatory action aims to contribute to the success of the ICT project as well as research on ICT in higher education institutions. Students who participate in this project will gain opportunity of learning from real-life enterprise-wide ICT project implementation as well as from relevant literature reviews on the subject; action-research based qualitative data gathering through interviews, participant observation, artefact and work process analysis; qualitative data analysis through inductive processes; and academic report writing. They will also learn from developing and presenting interim findings from real-life ICT projects at seminars, conferences and workshops to help finalize reports for submission to journals.

F: ICTs, Gender and Entrepreneurship (PI: Prof. Boateng)

This research seeks to develop a theoretical and practice-oriented understanding on the strategies which enable the male and female micro-entrepreneurs to establish enterprises (as driver or enabler) and how information and communication technologies (ICTs), through the businesses, impact on their livelihoods. The work has covered themes including mobile financial services, m-commerce adoption, mobile payments, mobiles and micro-trading, and mobile health. Currently funding has been received from the Canadian development agency, International Research Development Centre (IDRC) to explore the gender differences in entrepreneurship development and how ICTs mediates the differences. Students will gain opportunity of using both qualitative and quantitative research methods to develop an empirical understanding of ICTs, gender and entrepreneurship in Ghana. The students will also learn how to develop comprehensive literature reviews which cover a diversity of disciplines related to the project.

H: Advancing E-governance beyond Readiness (Co-PIs: Prof. Effah and Prof. Boateng)

This research seeks to establish a better understanding of e-governance (e-government and e-democracy) in sub-Saharan Africa in order to define appropriate approach to advance beyond the readiness to adopt e-governance. Current work is currently reviewing e-governance policies and programmes in a selected number of African countries and examining the interactions of citizens with government through social media. Students will gain opportunity of using qualitative data techniques to develop descriptive case studies explaining e-government development and implementation in Ghana.

SUPPORT SERVICES

Administrative and Academic Support

Administrative: School of Graduate Studies coordinates admission, registration and records, examination of theses and dissertations, official correspondence and welfare of graduate students. With the adoption of a new PhD programme structure by the University in 2013, a PhD Technical Committee was established to take oversight responsibility for issues related to PhD studies being coordinated by the School of Graduate Studies. On admission, each PhD student is given the Handbook for Doctoral Studies which details the regulations concerning the PhD program. The Department also provides the handbook for the PhD IS programme which details the curriculum and regulations for the PhD IS program. International Programs Office (IPO) also facilitates the recruitment and management of international students during the period of the program.

Academic: Doctoral Training: The Pan-African Doctoral Academy (PADA) at the university supports doctoral students with training, mentoring, career guidance and scholarship. The flagship of PADA is the Doctoral School which offers targeted courses (supervision, research methods, publications and ethics et cetera) on specialized topics and as well provide opportunities for interdisciplinary and cross-cultural learning. It is also an opportunity for students for network with students from Niger, Nigeria, Senegal, Togo, Uganda and South Africa. Participation in the doctoral schools are highly subsidized by grants from the Carnegie Corporation of New York. Seminar Series and Colloquia: The University frequently organizes research seminars and conferences which gives the opportunity for students to present their work and receive feedback. These include the UG Business School Seminar Series, the College of Humanities International Research Conference. Conference Support: UG Business School provides funding of up to US\$1000 for PhD students to participate in academic conference as recommended by the PhD Committee. Students can apply for the funding after completing coursework in Year One. In 2018, five students benefited from this grant. In addition, the Office of Research, Innovation and Development (ORID) periodically publishes a number of research grants from a diversity of research agencies which targeted at both PhD students and faculty. For example, for the past three years, the head of department has won a number of grants which has supported not less than five PhD students in carrying out their research activities or providing training for them (see resume of the head of department).

Support Services for International Students

A dedicated office, the International programs Office (IPO), which is headed by a Dean, has been set up to facilitate recruitment of international staff and students. IPO organizes educational fair for potential candidates, mount in-country exhibitions on programs at UG, present seminars and further encourage prospective students to apply. Together with the host department and School of Graduate Studies, the IPO provides support in the acquisition of visa/resident permit/letters of support, providing formal orientation transfer and verification of academic records/certificates, IPO also has an interactive website (<http://ipo.ug.edu.gh/>) which supports its services and also has a parent/guardian access portal to track academic progress of students and receive announcements and related information. IPO also has a student exchange programme that pairs visiting students with Ghanaian students who are in excellent academic standing and are of good behaviour, as peer partners to enhance cross

cultural experiences. It administers over 83 University partnerships in 27 countries. Students can opt for accommodation at the International Students Hostel (ISH) which is on a first come-first served basis due to the limited number of rooms. Rooms at the International Students Hostel are furnished with a bed, desk, chair and wardrobe. However, IPO can however facilitate accommodation in any of the on-campus housing facilities.

PUBLICATIONS BY PHD STUDENTS AND SUPERVISORS

Journal Publications by PhD Students

1. Adam, I.O., Effah, J., & Boateng, R. (2019). Activity theory analysis of the virtualization of teaching and teaching environment in a developing country university. *Education and Information Technologies*, 24(1), 251-276. Publisher: Springer.
2. Ofoeda, J., Boateng, R. & Asmah, A. (2018). Virtualization of government-to-citizen engagement process: Enablers and constraints. *Electronic Journal of Information Systems in Developing Countries*, 84(5), e12037. <https://doi.org/10.1002/isd2.12037>. Publisher: John Wiley & Sons Ltd.
3. Ansong, E. & Boateng, R. (2018). Organisational adoption of telecommuting: Evidence from a developing country, *Electronic Journal of Information Systems in Developing Countries*, 84(1), 1-15. <https://doi.org/10.1002/ISD2.12008>. Publisher: John Wiley & Sons Ltd.
4. Ansong, E., Boateng, S.L., & Boateng, R. (2017). Determinants of E-Learning Adoption in Universities: Evidence from a Developing Country. *Journal of Educational Technology Systems*, 46(1), 30-60. Publisher: Sage Publications
5. Adam, I.O., Effah, J., & Boateng, R. (2016). Using Activity Theory with Agency Theory: A Case Study of Administrative Work Environment Virtualization for Higher Education Information Management. *Journal of Enterprise Information Management*, 30(5), 723-747. Publisher: Emerald Publishing.

Book Chapter Publication by PhD Students

6. Asiedu, S.T., & Boateng, R. (2019). Development of Strategies and Transformation Paths for Structured and Targeted Digital Change: The Case of the Presbyterian Church of Ghana Trinity Congregation. In N. Urbach & M. Röglinger (eds.) *Digitalization Cases* (pp. 205-224). Springer, Cham.
7. Marfo, J.S. & Boateng, R. (2015). Big Data and Organizational Learning: Conceptualizing the Link. In Vincenti, G., Bucciero, A. & Carvalho, C. (eds) *E-Learning, E-Education, and Online Training*. (pp. 159-164). Springer International Publishing. DOI 10.1007/978-3-319-28883-3

Conference Publications by Students

8. Asiedu, S.T., Boateng, R., & Effah, J. K. (2018, December). User Resistance in Cloud Computing Post Adoption: Evidence from the Ghanaian Public Healthcare Sector. In *2018 IEEE International Conference on Cloud Computing Technology and Science (CloudCom)* (pp. 251-254). IEEE.
9. Budu, J., Akakpo, P. K., & Boateng, R. (2018). Completed Research: Preliminary Insights into the Impact of Digital Platforms for Music. *SAIS 2018 Proceedings*. 39. Retrieved 20 November 2018 from <https://aisel.aisnet.org/sais2018/39>

10. Ofoeda, J., & Boateng, R. (2018). Institutional Effects on API Development and Integration in Developing Countries: Evidence from Ghana. In *Twenty Fourth American Conference on Information Systems* (pp. 1–10). New Orleans, LA: Association for Information Systems Electronic Library. AMCIS 2018 -ISBN: 978-0-9966831-6-6
11. Owusu-Oware, E., Effah, J., & Boateng, R. (2018). Biometric Technology for Fighting Fraud in National Health Insurance: Ghana’s Experience. In *Twenty Fourth American Conference on Information Systems* (pp. 1–10). New Orleans, LA: Association for Information Systems Electronic Library. AMCIS 2018 -ISBN: 978-0-9966831-6-6
12. Amankwah-Sarfo, F., Effah, J., & Boateng, R. (2018). Import Clearance Digitalization and Socioeconomic Development: The Case of Ghana. In *Twenty Fourth American Conference on Information Systems* (pp. 1–10). New Orleans, LA: Association for Information Systems Electronic Library. AMCIS 2018 -ISBN: 978-0-9966831-6-6
13. Oforu-Ampong, K., & Boateng, R. (2018). Gamifying Sakai: Understanding Game Elements for Learning. In *Twenty Fourth American Conference on Information Systems* (pp. 1–10). New Orleans, LA: Association for Information Systems Electronic Library. AMCIS 2018 -ISBN: 978-0-9966831-6-6
14. Nyamadi, M., & Boateng, R. (2018). The Influence of IT Artifacts on Players Leading to Internet Gaming Addiction among University Students in Africa. In *Twenty Fourth American Conference on Information Systems* (pp. 1–10). New Orleans, LA: Association for Information Systems Electronic Library. AMCIS 2018 -ISBN: 978-0-9966831-6-6.
15. Nyamadi, M., & Boateng, R. (2018). Theorizing Technology Addictions: Model Development, Measurement and Effects on Productivity. *TREO (Technology Research, Education, and Opinion) Talks 2018 International Conference on Information Systems*. San Francisco, CA: Association for Information Systems Electronic Library.
16. Entee, E., Budu, J. & Boateng, R. (2018). Preliminary Insights into Social Commerce Capability Development. *MWAIS 2018 Proceedings*. 30. Retrieved 20 November 2018 from <http://aisel.aisnet.org/mwais2018/30>
17. Marfo, J.S., Boateng, R.A., & Effah, J. (2017). A Typology of Big Data Capabilities from Resources to Dynamic Capabilities. Evidence from a Ghanaian Health Insurance Firm. In *Twenty Third American Conference on Information Systems* (pp. 1–10). Boston, MA: AMCIS 2017 -ISBN: 978-0-9966831-4-2
18. Larkotey, W.O., Effah, J., & Boateng, R. (2017a). Development of E-Government Payment Portal: A Case Study from a Developing Country. In *Twenty-Second UK Academy for Information Systems Conference*. Oxford, UK: Association for Information Systems Electronic Library. UKAIS 2017 - ISSN978-0-9560272-6-9
19. Larkotey, W.O., Effah, J., & Boateng, R. (2017b). Development of E-Passport Application Portal: A Developing Country Case Study. In *Twenty First Pacific Asia Conference on Information Systems*. Langkawi, Malaysia: Association for Information Systems Electronic Library. Retrieved from <http://aisel.aisnet.org/pacis2017/195>
20. Larkotey, W.O., Effah, J., & Boateng, R. (2017). Development of Government-to-Employee Portals : A Developing Country Case Study. In *American Conference on Information Systems* (pp. 1–10). Boston, MA: Association for Information Systems Electronic Library. AMCIS 2017 -ISBN: 978-0-9966831-4-2
21. Owusu-Oware, E., Effah, J., & Boateng, R. (2017). Institutional Enablers and Constraints of National Biometric Identification Implementation in Developing Countries: The Case of Ghana. In *American Conference on Information Systems* (pp. 1–10). Boston, MA: Association for Information Systems Electronic Library. AMCIS 2017 -ISBN: 978-0-9966831-4-2
22. Adam, I. O., Effah, J., & Boateng, R. (2016a). Migrating from physical to virtual administrative work environment: A case study of a Sub Saharan African higher education institution. San Diego: Paper Presented at the *2016 Americas Conference on Information Systems*. ISBN: 978-0-9966831-2-8

23. Adam, I. O., Effah, J., & Boateng, R. (2016b). Virtualisation of administrative work environment in developing country higher education institutions: An activity theory perspective. *Research-in-Progress Papers*. 66.
Istanbul: 2016 European Conference on Information Systems.
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