UTech Jamaica 60th ANNIVERSARY
Pioneering Past Bright Future
1958 - 2018

University of Technology, Jamaica

RESEARCH, TECHNOLOGY & INNOVATION DAY 2019

GRADUATE STUDENTS' RESEARCH

"PREPARING THE NEXT GENERATION OF RESEARCHERS TO ADVANCE KNOWLEDGE AND SOLVE PROBLEMS."

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MISSION

To positively impact Jamaica and the wider Caribbean through high quality learning opportunities, research and value added solutions to government, industry and communities.

VISION 2025

We are the #1 University in the Caribbean for work-ready leaders, committed to transforming students and society through high quality teaching, research and value added services.

University of Technology, Jamaica

INSTITUTIONALLY ACCREDITED BY THE UNIVERSITY COUNCIL OF JAMAICA (UCJ)

As a testament to the high quality of our programmes, UTech, Jamaica has received Institutional Accreditation from the University Council of Jamaica (UCJ)

Benefits of Institutional Accreditation

- Full recognition of our certification by both public and private sectors locally & internationally
- Easier transition for our graduates into other universities both local and overseas
- Confirmation that we are delivering quality education at international standards

The Birthplace of Greatness

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The University of Technology, Jamaica is in solidarity with the government of Jamaica's position that tertiary institutions must produce research that is fundamental to Jamaica's growth and development.

UNIVERSITY PRESIDENT

~ Prof. Stephen Vasciannie

In 1995, when the institution was officially granted university status by an Act of Parliament, research output was immediately elevated as an important pillar in the core mission of the University. This mission is "to stimulate positive change in Caribbean society through the provision of high quality learning and research opportunities and service to our communities."

In this 60th Anniversary year of the establishment of the institution and in light of the recent granting of institutional accreditation by the University Council of Jamaica, UTech, Jamaica is working to strengthen its contribution to the advancement of society through teaching, scholarship and research.

Consistent with this focus, this year's annual Research, Technology and Innovation Day is being staged under the theme, "Research and Innovation...Fueling a Bright Future."

The University of Technology, Jamaica is in solidarity with the government of Jamaica's position that tertiary institutions must produce research that is fundamental to Jamaica's growth and development.

UTech, Jamaica also shares unequivocally in the national thrust to steer research in the priority areas of Science, Technology, Engineering and Mathematics (STEM); at the same time, we are also keen to undertake research in other areas of national and regional life, including Law, Business, Education, Liberal Studies and Management. Our burgeoning researchers at the undergraduate and graduate levels are critical contributors of research and innovation that will fuel future solutions to national problems.

This special publication highlights important aspects of graduate education at the University and some of the research work being done by our graduate students under the supervision of faculty members.

I invite partners in government, industry and academia to engage with the University of Technology, Jamaica in the journey of advancing discovery and the sharing of new knowledge for the benefit of humanity.

DEPUTY PRESIDENT

~ Prof. Colin Gyles

As we approach the end of this 60th anniversary year, I reflect on the fact that our University has achieved much, and still has much more to contribute to solving some of the major challenges confronting our country. We seek to contribute to research, technology and innovation, as pathways to national development.

To this end, we teach students how to be active producers of knowledge, how to develop the skills of ideating and converting ideas to wealth and innovations. It is a part of our focus to create the conditions that encourage young researchers to become more adept at investigation and critical analysis; be more enthused at the possibilities of implementing these solutions in society, and become more motivated to add to the existing body of knowledge. In pursuit of our objectives, we have placed special emphasis on the research work done by Graduate Students in this 2019 publication. Subtitled "Preparing the Next Generation of Researchers to Advance Knowledge and Solve Problems," this publication aptly showcases the capacity of the research capability of our graduate students, as well as the supporting role of the School of Graduate Studies, Research & Entrepreneurship (SGSRE) in creating and facilitating access to an environment conducive to research.

« ***...we teach students how to be active producers of knowledge, how to develop the skills of ideating and converting ideas to wealth and innovations.***

I commend the committed staff of the SGSRE, for coordinating the production of this publication, and applaud the Faculty members who continually provide supervision to graduate research students. I also congratulate our students whose research work is being featured.

In reading this publication, I hope you will be captivated by the titles of the Theses and Dissertations, impressed with the Abstracts, drawn by the depth and novelty of the information, and find relevant application in keeping with our interdisciplinary approaches.

The overarching mission of the University is to "positively impact Jamaica and the wider Caribbean through high quality learning opportunities, research, and value added solutions to government and industry". I commend to you the research of our graduate students as a part of our efforts to fulfill this mandate, confident that the legacy of research will continue with successive generations of students, and that the future of research contributions to our society will be in good hands.

Education is central to the long-term development of human capital and to economic growth. It empowers people and strengthens nations, while also providing individuals with the skills they need to compete in today's global economy, where a high-quality education is critical for creating, applying and disseminating knowledge (The World Bank).

ASSOCIATE VICE PRESIDENT, GRADUATE STUDIES, RESEARCH AND ENTREPRENEURSHIP

~ Dr. Paul W. Ivey

Pursuing graduate studies is at once demanding, exciting, and rewarding. Demanding in that it requires students to exit and exert themselves well-beyond their "cognitive comfort zones." Exciting and rewarding in that it provides opportunities for students to be creative and produce work that extends the boundaries of existing knowledge or apply existing knowledge in novel ways to advance societal welfare.

Higher education institutions (HEIs), such as universities, have a special role to play in knowledge generation through research and in the application of said knowledge to satisfy needs or solve problems, through innovation. Indeed, to "preserve, advance and disseminate knowledge and culture through teaching, scholarship and research' as well as to "make available the results of such research and service" are expressly stated as being among the purpose for which UTech, Jamaica was established.

Jamaica has articulated an innovation-centric development strategy. Therefore, UTech, Jamaica is one of the key HEIs that must meet the demands of Jamaica for highly-skilled innovation-capable graduates equipped with the technical and thinking skills required to innovate. Innovation is an imperative for Jamaica. Now celebrating its 60th Anniversary, and granted Institutional Accreditation in December 2018, by the University Council of Jamaica, UTech, Jamaica is equal to the task - the history of the institution is closely connected with the social and economic development of Jamaica.

I am pleased to have edited this publication - with the support of other colleagues- that highlights for our various publics the diverse and relevant research work undertaken by Graduate Students under the supervision of Faculty Members. Here at UTech, Jamaica, we are indeed preparing the next generation of researchers to advance knowledge and solve problems.

STUDENTS' UNION GRADUATE STUDENTS' REPRESENTATIVE

~ Ms. Melissa Salmon

Congratulations on the staging of Research, Technology, and Innovation Day (RTID) 2019! "Research and Innovation... Fueling a Bright Future" is a fitting theme at a most important and exciting time in the history of UTech, Ja. – celebration of its 60th Anniversary!

RTID 2019 has placed emphasis on highlighting the high quality research work of graduate students, which is a foundation for the advancement of a small island developing state such as Jamaica. The interconnectedness of research, technology, and innovation (RTI) makes the need for investment in human capital development, given that the returns and benefits are immeasurable.

Importantly, too, critically-needed support for graduate students as contributors must not be overlooked. Clearly, the university understands that the output from its investment in research can shape our reality as a nation and formulate practical solutions for real-world challenges to the benefit of present and future generations. RTID is about helping to create a better environment for humanity and its composites. Let us all not only laud the strides that have been accomplished, but fully support RTI as a continuous duty for our bright future!

« ***RTID is about helping to create a better environment for humanity and its composites. Let us all not only laud the strides that have been accomplished, but fully support RTI as a continuous duty for our bright future!***

INTRODUCTION

THE "PEOPLE'S UNIVERSITY"

The University of Technology, Jamaica (UTech, Jamaica) prides itself on fulfilling its objective as "The People's University," dedicated to facilitating access to opportunities for learning and to meeting the growth and development needs of Jamaica.

RESEARCH STRATEGY STATEMENT

In its Strategic Plan, 2018-2022, and consistent with its "Objects," the University of Technology, Jamaica has articulated the goal of delivering on its mission and increase its positive impact on Jamaica and the wider Caribbean by: increasing its impact by focusing on applied research to address national and regional challenges and by lobbying decision makers (Strategy Statement, No. 4). In this regard, the research undertaken by our faculty members and the graduate students they supervise is of paramount importance.

VISION 2030

UTech, Jamaica's role at the national level is of particular significance because it is one of the key higher education institutions (HEIs) that must contribute to the realization of Vision 2030, Jamaica's first long-term National Development Plan that is aimed at the achievement of developed country status by the year 2030. The National Development Plan is based on a comprehensive vision: "Jamaica, the place of choice to live, work, raise families, and do business."

UTech, Jamaica will increase its impact by focussing on applied rsearch to address national and regional needs.

THE "OBJECTS" OF THE UNIVERSITY OF TECHNOLOGY, JAMAICA

The "objects" of University of Technology, Jamaica that have been articulated in ACT of Parliament establishing the institution are, to:

1. "Advance education and development of technology through a variety of patterns, levels and modes of study and by a diversity of means by encouraging and developing learning and creativity for sustainable development for the benefit of the people of Jamaica, the Caribbean and elsewhere, to;
2. Preserve, advance and disseminate knowledge and culture through teaching, scholarship and research;
3. Make available the results of such research and service; and
4. Promote wisdom and understanding by the example and influence of corporate life."

PURPOSE & ORGANIZATION OF THIS PUBLICATION

The purpose of this publication is to highlight an important aspect of graduate education at the University - research work done by Graduate Students under the supervision of Faculty Members. Therefore, this publication curates from our archives a selection of Abstracts from Graduate Students' Theses and Dissertations spanning the period 2001-2018.

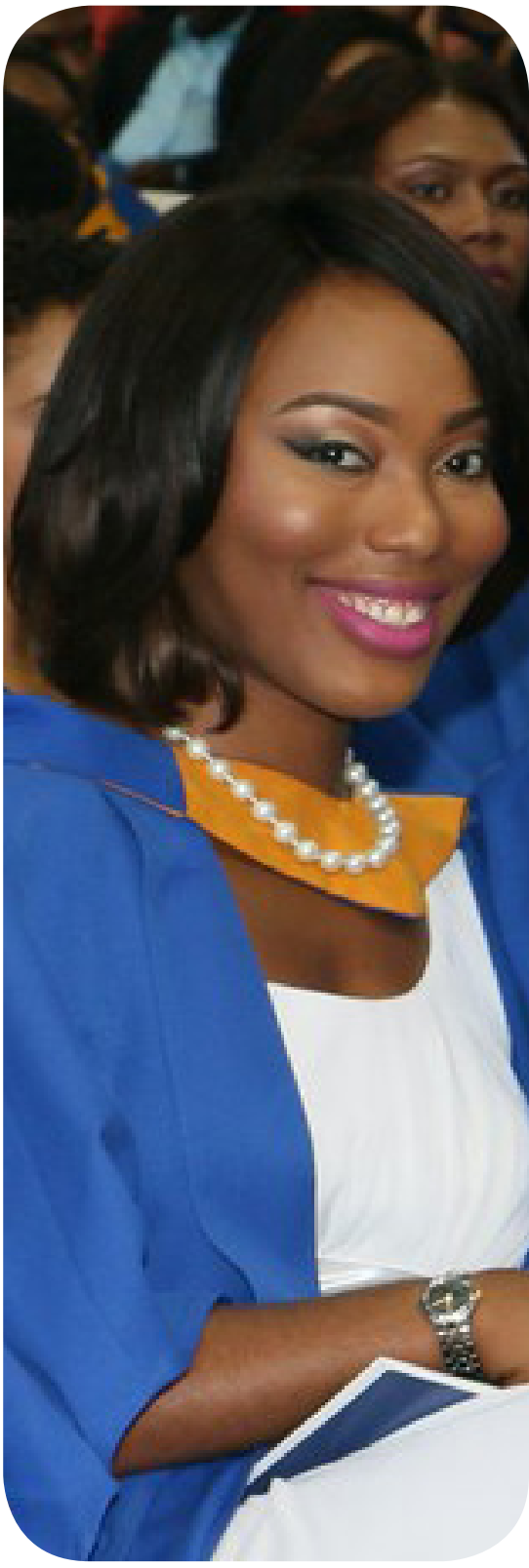
The entries cover research on topics in all disciplines offered by the University and are arranged as follows: Academic Unit, Title of Thesis/ Dissertation, Name of Student, Supervisor(s), Year of Completion, and Type of Degree.

This publication also provides information about the governance and administration of graduate education at the University, as well as a listing of the graduate degrees currently offered.

GOVERNANCE & ADMINISTRATION OF GRADUATE COURSES

SCHOOL OF GRADUATE STUDIES, RESEARCH & ENTREPRENEURSHIP

The School of Graduate Studies, Research & Entrepreneurship leads and manages the development and delivery of graduate courses at the University of Technology, Jamaica consistent with best practices and standards.



The University's graduate courses are delivered through our colleges and faculties listed below, and are designed to meet the needs of our students with convenient delivery modalities and various matriculation options, including prior learning assessment.

- ***College of Business and Management***
- ***College of Health Sciences***
- ***Joint Colleges of Medicine, Oral Health and Veterinary Science***
- ***Faculty of The Built Environment***
- ***Faculty of Education and Liberal Studies***
- ***Faculty of Engineering and Computing***
- ***Faculty of Science and Sport***

N.B. The Faculty of Law, UTech, Jamaica's eighth academic unit, does not currently offer graduate courses.

Specific roles and responsibilities of the SGSRE with respect to graduate education at the University include:

- Providing linkages among Graduate Studies, Research and Entrepreneurship
- Promoting industrial/professional graduate research degrees at both master's and doctoral levels
- Organizing a system of effective mentorship and supervision of graduate students
- Establishes system for the protection of Intellectual Property
- Benchmarking of graduate studies, research, and entrepreneurial activities.

GRADUATE STUDIES, RESEARCH & ENTREPRENEURSHIP COORDINATORS

The College/Faculty Coordinators for Graduate Studies, Research & Entrepreneurship serve as the critical link between the School of Graduate Studies, Research & Entrepreneurship and the University's Colleges and Faculties. These Coordinators, guided and supported by the SGSRE and their respective College/Faculty Boards, serve as the front-line officers with respect to graduate education, research, and entrepreneurship for their respective Colleges and Faculties.

BOARD OF GRADUATE STUDIES, RESEARCH AND ENTREPRENEURSHIP (BGSRE)

The Board of Graduate Studies, Research, and Entrepreneurship (BGSRE) is mandated by the Academic Board to guide and supervise the work of the School of Graduate Studies, Research and Entrepreneurship (SGSRE). Accordingly, the Board of Graduate Studies, Research and Entrepreneurship:

Advises the Academic Board on resolutions, policy and procedures relating to the design, delivery, assessment, and quality of graduate courses of study, research, and related areas of entrepreneurship and innovation within the University.

Approves proposals on policy and regulations governing graduate courses of study (taught and research), research, and research-related activities within the University.

Advises the Academic Board on quality assurance and regulatory issues and on the sharing of good practices in respect of graduate education.

ABSTRACTS OF GRADUATE STUDENTS' THESES AND DISSERTATIONS 2001 - 2018


16
14

AN INVESTIGATION OF KNOWLEDGE ATTITUDE AND PRACTICE OF COMMUNITY PHARMACISTS TOWARDS PHARMACEUTICAL CARE IN PRIVATE RETAIL PHARMACIES IN JAMAICA

Student:
ROSE VICTORY EVANS

Supervisor:
DR. LISA BROMFIELD

Year Submitted:
2018

Degree:
POST BACCALAUREATE DOCTOR OF PHARMACY (PHARM. D)

Pharmaceutical care (PC) is the responsible provision of pharmacotherapy to achieve pre-defined health-outcomes that improve a patient's quality of life. The knowledge and attitude of pharmacists may influence the provision of PC.

> **"The purpose of this study was to investigate the Knowledge, Attitude and Practice (KAP) of the community pharmacists towards PC in private retail pharmacies in Jamaica."**

A mixed-method comprised of quantitative (focus group) designs facilitated substantial data collection for analysis. A total of one hundred and ninety-three community pharmacists completed pre-tested self-administered questionnaires. A moderated focus group session supplied qualitative data from six stakeholders oh pharmacy. The Statistical Package for Social Sciences (SPSS) version 20 and Microsoft Word 7 speech to text software assisted in the analysis questionnaire responses and transcription of qualitative data respectively. More than ninety percent of survey respondents were knowledgeable about PC, and greater than eighty percent showed a positive attitude towards PC. However, a low proportion of respondents (47.5%) performed PC activities. Conversely, all focus group participants grade pharmacists based on attainment of a Diploma, Bachelor and Doctor of Pharmacy respectively. The perceive proportion of community pharmacists who practices PC was 30%. The significant barrier identified by survey respondents was a lack of resources (time, physical infrastructure and manpower), similar to the perception of the focus group. Additionally, the focus group perceived that daily workload of pharmacists was another significant barrier.

The study concluded that community pharmacists had a high knowledge of PC and a positive attitude, but low practice. Overcoming barriers will facilitate greater implementation and provision of PC activities and community-based PC services.

ADOPTION OF CLOUD COMPUTING TECHNOLOGY IN HIGHER EDUCATION OF A DEVELOPING COUNTRY: AN INVESTIGATIVE UNIVERSITY CASE STUDY ON FOUR INFLUENTIAL FACTORS

Student:
DELROY BROWN

Supervisor:
PROF. FELIX AKINLADEJO

Year Submitted:
2018

Degree:
MASTER OF ARCHITECTURE (M. ARCH.)

“This study was undertaken to investigate how the pedagogy being practiced, level of awareness, trust, (level of comfort), and cloud support mechanisms have influenced the adoption of cloud computing technology in higher education (HEI) in a developing country through a university case study.”

HEI encompasses post-secondary education at institutions such as universities that are authorized as institutions of higher education by state authorities (Japan International Cooperation Agency (JICA), 2004). A quantitative approach was undertaken in completing this research with the aim of analyzing how factors such a pedagogy, awareness, trust (Level of comfort) and cloud support mechanisms influenced perceived usefulness of cloud computing which ultimately drives interest towards the adoption of cloud computing in HEIs. Cloud computing (CC) is the use of the internet to dynamically (anywhere, anytime) utilize the software and services such as email, collaborative tools, social networks, data processing and storage for free with limited usage or from a Cloud Service Provider (CSP) pay per use (Cisco, 2009, p.3). CC is similarly viewed as convenient network access to a shared pool of computing resources. This investigative approach with related findings revealed that pedagogy, awareness, trust (level of comfort) and cloud support mechanisms have impacted cloud technology adoption (usage) with varying intensity.

These findings therefore go beyond the elements of experience and age and provide new and useful that can assist in explaining why the adoption of CCs in HEIs of developing states to relatively new and slow compared to similar institutions in developed states.

The major findings formed the basis for five (5) major recommendations to improving and increasing the current use of cloud computing technology in HEIs.

There are positive implications that can result in the planning, implementation, and anticipated use of cloud technology in universities if these recommendations are accepted by stakeholders associated with HEIs in developing states in particular the Caribbean region in which Jamaica is located. There are some inherent limitations in the research method, time, population sample, and the online data collection approach, However, embedded in this research is valuable information that shows that pedagogy, awareness, trust (level of comfort), and cloud support mechanisms are influencing the usage of CC and therefore suggests that the use of technology should be encouraged. Additionally, more research should be done across a wider cross-section of higher educational institutions on the current state of cloud technology usage in an effort to promote e-education.

FILM AS AN URBAN ANALYSIS TOOL : THE REPRESENTATION OF THE EXPERIENTIAL QUALITIES OF URBAN STREETS IN JAMAICAN FILMS

Student:
DEWAYNE WEBB

Supervisor:
ARCHITECT JACQUIANN LAWTON

Year Submitted:
2018

Degree:
MASTER OF ARCHITECTURE (M. ARCH.)

It is vital that our urban areas cater to the needs of the ever-increasing population, but for any designed space to be successful, a holistic understanding of how a culture uses and appropriates the public sphere is of utmost importance. Visual representations of the aesthetic, spatial, social and economic that constitute cities when represented through forms of visual representations are generally abstracted or modeled as spatial interpretations, however, images of lived spaces can illustrate complex urban, social and cultural phenomenon and their relations to each other.

> **“The research aims to investigate the hypothesis that through films, images of lived spaces can illustrate complex urban, social and cultural phenomena in a way which can aid the typically abstracted urban analyses and to investigate the possible ways in which film, and two dimensional drawings and diagrams in yield data and possible convergences, parallels and differences in the methods of representation.”**

The research questions are answered by an interpretive analysis of a primary urban element, the urban Street/Pathway in five Jamaican films and three Urban Study Documents of the Master of Architecture Programme at the Caribbean School of Architecture. The investigation highlighted the strength of film as a representational tool through the concepts of narrative and composition. It also highlighted the shared parallels between two-dimensional representation and film in how the notion of narrative and composition is applied.

The research strongly indicated the viability of film as a tool to represent and examine complex urban, social and political data, particularly within diverse urban areas.

The research also demonstrated the viability of film as a medium to communicate the experiential qualities of an urban space.

On this basis, it is recommended that further research is conducted to investigate the extent to which the analysis of urban spaces through film can impact urban designers, architects and design students.

CITIZENS' VISION FOR URBAN REGENERATION: SPANISH TOWN THROUGH THE EYES OF THE PEOPLE

Student:
ADRIAN HEWARSTON HALL

Supervisors:
MR. L. MARK TAYLOR,
DR. ELIZABETH PIGOU-DENNIS

Year Submitted:
2018

Degree:
MASTER OF ARCHITECTURE (M. ARCH.)

> **"The Urban fabric of Spanish Town like many other towns in Jamaica is currently in a deplorable state. Words like crime and violence, evil, dirty and Ghetto has been used to characterize this once prosperous town."**

A feeling of fear and hopelessness is ever-present when one navigates through the zinc fence and shack filled town, where squatter settlements and street-side vendors seem to be on the forefront in every direction. The streets are unsightly with uncovered drains containing black squalid water and unfriendly sidewalks throughout the town Centre. Further compounding the thought that this place is a forgotten town is the evident low level of public of private development or investment, while crime and violence has stained the name of Spanish Town.

The town has degenerated over time and it is the contention of this thesis that architecture can be a possible catalyst for the regeneration of Spanish Town central.

TRUST AND SECURITY IN E-BANKING: THE PERCEPTIONS OF BANK CUSTOMERS IN JAMAICA

Students:
JODIAN BLAKE
ALTHEA JOHNSON-ROACH

Supervisor:
MR. LEIGHTON MITCHELL

Year Submitted:
2018

Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

With increased competition from traditional and non-traditional financial institutions, banks are aggressively expanding their services through digital channels to meet customers' digital needs and reduce cost. Despite these efforts, many customers are refusing to abandon the physical channels, while many others welcome the change. The main issue with the implementation of e-banking channels by financial institutions has to do with customers' acceptance and perceptions of the technology itself; half of the people who have tried internet banking services will not become active users.

> **"Research conducted in Jamaica identified trust and perception of security as factors affecting the acceptance and use intention of Banking Information Systems (BIS) like e-banking in the island."**

The correlation between these factors and its antecedents are yet to be investigated in Jamaica. Drawing on the Innovation Diffusion Theory (IDT), the Technology Acceptance Model (TAM) and prior research, this research examined and combined a model of trust, perceived security and customer service management to determine the impact of customers' point of view, the important considerations for improving their security perceptions and comfort with the technology. The paper applied the analysis procedures of Reid and Levy (2008) and Law (2007) for evaluating the findings. Through the use of convenience sampling and Structural Equation Modeling (SEM), quantitative data was captured from 205 respondents to reveal that perception of security had a significant impact on trust. Structural assurance attributes (security mechanisms) were the most critical factor for improving a customer's perception of security. The results obtained can be useful in predicting customers' future behaviour towards new e-services and enlighten on the critical elements necessary for the success of these e-services.

A STUDY OF BEHAVIOURAL INTENTION TO USE SCHOOL MANAGEMENT INFORMATION SYSTEM FOR INSTITUTIONAL EFFECTIVENESS

Students:
GARTH BECKFORD
DAMON CARR

Supervisors:
PROF. FELIX AKINLADEJO
MR. TYRONE EDWARDS

Year Submitted:
2018

Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

> **“The use of school management information systems has helped academics in many parts of the world to accomplish more efficient administrative services by improving data storage, retrieval, presentation, and enabling the use of data for better decision making.”**

Although the use of school management information systems is in its infancy in Jamaican schools, most schools in the country show a great interest in the adoption of information systems to manage student data. In determining the significance of a particular computer application and predicting the behavioural intention to use school management information systems, this study proposed a theoretical framework that included the core constructs in TAM: namely, perceived ease of use, perceived usefulness, and attitude toward usage. Additionally, external variables were also adopted – namely, the lack of school management system availability, prior experience, i.e. school management system success factors. The structure of the research model proposes that the variables contained within it have a direct or indirect effect on the behavioural intention to use school management information systems. The data was collected quantitatively from a sample of academic staff in primary schools with the aid of an online questionnaire.

The main TAM constructs were validated and the results indicate that users have a generally positive behavioural intention to use school management information system.

This suggests that the modified TAM used in this research is a valid tool for institutions to employ for predicting likelihood for success of school information system adoption.

BLOCKCHAIN TECHNOLOGY FOR HEALTHCARE IMPROVEMENT: A CASE FOR THE DEVELOPING ECONOMY

Students:
DENYSE HENLON,
RAYNOLD MAXWELL

Supervisor:
PROF. FELIX AKINLADEJO

Year Submitted:
2018

Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

“This research investigated the use of Blockchain technology on the Healthcare Improvement. It studied the impact of Blockchain technology on the daily operations of a selected public healthcare institution.”

The research identified some areas of weaknesses in the operation of the institution, which include using disparate systems. Other areas of the institution operate using a totally manual system. Consequently, tasks take a long time to complete and as a result patients and suppliers of the institution have to wait an inordinate amount of time to be serviced. The research assessed the usefulness of Blockchain technology to improve these identified areas of weaknesses, and identified the extent to which Blockchain technology can increase efficiency, traceability, accountability, transparency, and auditability in healthcare institutions, using the Western Regional Health Authority (WRHA) as a test case. Questionnaires, focus group interviews along with a pilot study were conducted to carry out the research work. The survey and focus group respondents were employees of the six (6) departments of the WRHA that were studied. The departments are Accounts, Human Resource, Customer Service, Registration, Procurement and General Stores. The questionnaire and focus group data were collected over a four (4) week period while the pilot study was completed over a two (2) week period.

The findings of the study revealed that one hundred percent (100%) of the participants believe that Blockchain technology will improve the operations of the healthcare institutions within the WRHA.

The participants also supported the need to adopt Blockchain technology in order to further improve the efficiency of operations within the public healthcare institutions. The research contributed to the ways in which healthcare can be improved in a developing economy.

TOWARD DEVELOPING DATA MINING MODELS TO PREDICT INCOMING UNDERGRADUATE STUDENTS RETENTION AT THE UNIVERSITY OF TECHNOLOGY, JAMAICA

Students:
ADALE HINDS
CHRISTOPHER PANTHER

Supervisor:
MR. LAVARE HENRY

Year Submitted:
2018

Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

Low student retention rates reflect badly on universities and pose an issue for the institutions' policymakers. By using data mining to predict and identify students that are at risk of dropping out of their course study, institutes of higher learning can improve their retention rates. Data Mining has been extensively utilized in driving business success for decades, in areas like fraud detection and customer retention.

> **"Almost all data mining techniques used in business applications can be applied to solving higher education problems."**

The increasing amount of educational data can be regarded as a goldmine, from which knowledge about students' behaviour, preference and performance can be discovered. In this study data mining and analysis was done on a data set supplied by the University of Technology (UTech), Jamaica. The dataset included variables on pre-university information (enrollment data) on students that spanned 4-year bachelor's degree cohorts. The focus of this research was to investigate the major factors influencing student retention among undergraduate students at UTech, and to determine whether applying Logistic Regression, Neural Networks, K-Nearest Neighbours (K-NN), and J48 Decision Tree algorithms to those factors, relatively accurate predictive models may be developed, capable of identifying the incoming undergraduate students at UTech, Jamaica, who are most at-risk of becoming dropouts, i.e. not continuing to graduate within the specified time, and also to determine which of the predictive data mining models best lends itself to be the most useful at identifying the at-risk incoming students at UTech. To determine which of the four predictive models could be considered as the most useful, the researchers compared the Accuracy and Area Under The Curve (AUC) statistical data for each of the four algorithms.

The AUC was chosen as the better metric for determining which algorithm is more useful, because of its ability to consistently give predictions regardless of whether the dataset is imbalanced.

In light of this, the researchers determined that though the J48 Decision Tree model had the greater accuracy of 66.06%, when compared to the other three models, the K-NN model with the greater AUC value of 69.4%, lends itself as the more useful model for predicting the incoming undergraduate students who are most at-risk of becoming dropouts at the University of Technology, Jamaica.

ICT MULTIMEDIA TOOLS: A CASE STUDY TO IMPROVE PRIMARY LEVEL LITERACY

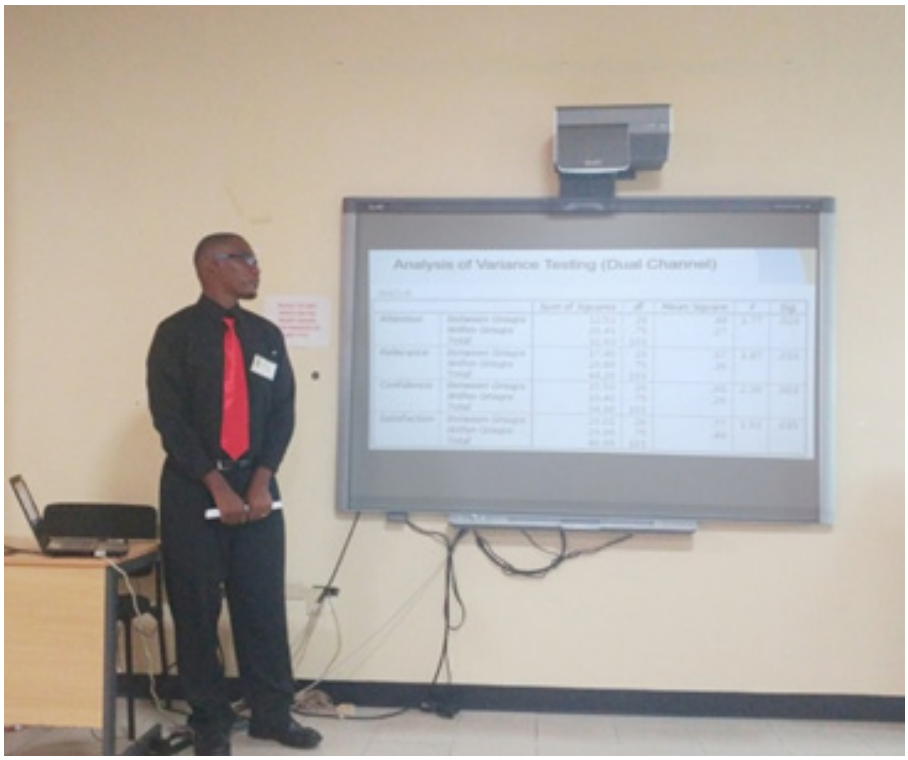
Student:
LUSHANE JONES

Supervisor:
DR. SHERRENE BOGLE

Year Submitted:
2018

Degree:
MASTER OF PHILOSOPHY (MPHIL) IN INFORMATION SYSTEMS

“The paper investigates the impact of interactive gaming on improving literacy at the primary or elementary level of education.”



The correlation between these factors and its antecedents are yet to be investigated in Jamaica. Drawing on the Innovation Diffusion Theory (IDT), the Technology Acceptance Model (TAM) and prior research, this research examined and combined a model of trust, perceived security and customer service management to determine the impact of customers’ point of view, the important considerations for improving their security perceptions and comfort with the technology. The paper applied the analysis procedures of Reid and Levy (2008) and Law (2007) for evaluating the findings. Through the use of convenience sampling and Structural Equation Modeling (SEM), quantitative data was captured from 205 respondents to reveal that perception of security had a significant impact on trust. Structural assurance attributes (security mechanisms) were the most critical factor for improving a customer’s perception of security. The results obtained can be useful in predicting customers’ future behaviour towards new e-services and enlighten on the critical elements necessary for the success of these e-services.

It builds on the works of Keller's ARCS (Attention, Relevance, Confidence, and Satisfaction) Model of Motivation and Mayer's Cognitive Theory of Multimedia Learning (CTML) to test the positive effects of Information and Communication Technology Multimedia Tools in early childhood literacy in a developing country. A comparison between traditional instruction and the use of multimedia technology tools at the elementary level is given as well as the acceptance of and opposition to technology in the classroom. Post test results indicate a 43.7% improvement over pre-test scores for the experimental group versus 28.3% for the control group. Questionnaire responses from parents and teachers of children in primary education, with majority responses from primary school teachers, were used to analyse the correlation between student motivation and use of ICT/Multimedia tools in the classroom.

Pearson's Correlation showed that out of 102 respondents, an average of 77% believed there was a moderate positive correlation between the ARCs Model variables (Attention, Relevance, Confidence, Satisfaction) and Mayer's CTML (Cognitive Theory of Multimedia Learning) Dual Channel assumption.

ASSESSING RELAY ATTACKS IN NFC ENABLED DEVICES USING THE TWO FACTOR RELAY ATTACK TEST ENVIRONMENT (RATE)

Students:
LA-DENE FORRESTER
RUPERT SHAW

Supervisor:
DR. SEAN THORPE

Year Submitted:
2018

Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS

Near Field Communication (NFC) is an advancement of inductively coupled proximity Radio Frequency Identification (RFID) technology and smart card technology.

> **"In our work we demonstrate specifically the ranges over which possible relay attacks could occur given the proximities (i.e. near and far range). Our work significantly supports a viable technical case for which to make a general public aware of the type of vulnerabilities encountered using NFC proximity devices."**

The application of the technical use case is to support transactions for mobile devices and, in our case, we use android phones as the test bed. We produced attack simulations on different proximity relay ranges confirming how easy it is to become compromised by way of mobile payment device eavesdropping. Empirical results obtained from this quantitative study shows that an NFC relay attack on a Far-Range can be up to approximately 170 meters (m). This exceeds the standard 100 meters (m) on Far-Ranges after we had completed the range location testing of devices. The results of our study challenge, the basic tenets of the ISO 14443 definition on the NFC ranges. Our findings support the need for the classification for what we describe as a "mid-range" proximity to support both the near and far range classifications. Particularly important is that these three ranges now have new range values to support potential new thresholds over which to simulate an NFC relay attack. Our contribution challenges the need for the NFC standards to be continuously revised in face of the continuous improvements for the capacity and coverage given these devices. In this context, the work defined in this capstone project support two (2) research questions namely: 1. How does an increase in channel distance impact the access success rate on an NFC enabled device over a Far-Range and Close-Range Relay Attack channel? 2. What conclusions can be made through a comparison of the access success rates resulting from the Close-Range and Far-Range experiments presented? Our experiments at a wider scale demonstrate the types of possible impact with respect of how existing NFC device technologies are now being implemented in commercial applications.

The extent of the use of our study impacts industries such as banking and telecommunications. This study represents the first of its kind that we have seen anywhere, with new novel preliminary results to substantiate this claim.

TOWARDS USING DATA MINING TO ANALYSE ONLINE LEARNING ENVIRONMENT USAGE AND ITS RELATIONSHIP WITH ACADEMIC PERFORMANCE

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Year Submitted:
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MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

“This thesis investigates students’ usage of online learning environments and its effect on their academic performance using data mining from a Caribbean perspective. The patterns discovered from the data mining process will improve stakeholder benefits from the usage of online learning environments at the tertiary level.”

Using students’ usage data gathered from Moodle activity logs, the popular data mining tool Weka was used to conduct three mining tasks namely k-means clustering, association rule and classification to unearth usage patterns and knowledge discovery.

The data mining processes were studied and analysed and the results revealed that content access activities relating forums had the largest number of hits.

Relating to academic performance, when compared with usage activity over the years 2015 and 2016, although students with the higher online usage activities received higher grades, generally the result showed that there is very little difference between level of online activity and grades. Also most of the online activities occur during the afternoon into evening period using mainly external internet sources.

In light of these findings, the stakeholders will generally need to examine the presentation and infrastructure of the online learning environment with the aim of improving students’ overall academic performance.

THE PERCEPTION OF TOURISTS TOWARDS USING AUGMENTED REALITY IN THE JAMAICAN TOURISM INDUSTRY

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“This study examines the perception of Jamaican tourists towards using Augmented Reality (AR). Emerging technologies, which enhance the processes of travel nationally and internationally and increase visitors’ enjoyment of destinations are of primary relevance to the tourism sector and have the potential for tourism-dependent countries such as Jamaica.”

Literature indicates that current implementations of AR applications in tourism lack effective engagement of user when implementing AR. Thus, this research seeks to address this gap by identifying the extent to which Jamaica tourists are willing to use AR. Additionally, it aims to find out what aspect of the Jamaican tourism sector would best benefit tourists from using AR technology. Technology acceptance research has tended to focus on the instrumental beliefs such as perceived usefulness and perceived ease of use as drivers of users’ attitude and behavioral intention to use, with technology characteristics as major external stimuli.

Hence, in this study, the Technology Acceptance Model was extended with three external constructs, Personal Innovativeness, Information Quality and Cost to derive a theoretical model to understand the relationships that influence tourists’ perception and intention to use AR in the Jamaican Tourism Industry. These eight constructs defined perception in this study.

A quantitative research was conducted with a sample of 75 tourists who completed surveys. Structural equation modeling (SEM) was employed to test the theoretical model which consisted of eight latent constructs (personal innovativeness (PI), information quality (IQ), Cost, perceived ease of use (PEOU), perceived enjoyment (PE), attitude to use (ATU) and behavioral intention to use (BI)). The SEM analysis reveals strong causal relationship between personal innovativeness, information quality and the tourist perceptual beliefs-perceived usefulness and enjoyment, which in turn impacted their attitude and intention to use AR. The study also indicated that tourists were more interested in AR uses in outdoor navigation than any other area.

The study concludes with some important implications for developing mobile AR applications for the Jamaican Tourist Industry and implementing strategies using AR.

THE WILLINGNESS TO ADOPT FITNESS WEARABLES IN JAMAICA: A STUDY ON WEARABLE FITNESS TRACKERS IN KINGSTON AND ST. ANDREW

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“Research by the Jamaica Health and Lifestyle Survey Group has found that there is a high incidence of non-communicable diseases in Jamaica (NCD) such as diabetes and hypertension, and these diseases have become one of the main causes of death and disability in Jamaica.”

It is known that being physically active is one of the primary ways to reduce the chances of developing NCDs, however there is concern that persons are not engaging in sufficient levels of physical activity, Wearable fitness trackers are seen as a promising tool to facilitate health interventions for physical activity, by providing users with the ability to self-monitor and self-regulate. However, very little if any literature on Jamaicans’ behavioral intent towards using wearable fitness trackers exists. The purpose of this research is to investigate the adoption of wearable fitness trackers in Jamaica. This will be achieved by examining the extent to which persons are willing to use wearable fitness trackers and the non-technical factors that affect this analysis. The study used a quantitative cross-sectional survey approach, using quota sampling to select members of the sample population.

The sample consisted of adults, 18 years and older, from Kingston and St. Andrew. Our proposed model was based on the Unified Theory of Acceptance and Use of Technology (UTAUT-2) technology acceptance model, using the most relevant constructs from the model, while also including additional constructs to address concerns relevant to the particular context.

Ordinal regression and other statistical data association techniques were used for analysis. Ninety-five (95) of 119 respondents (80%) had a positive behavioral intent to use wearable fitness trackers Facilitating conditions, performance expectancy, hedonic motivation, effort expectancy and privacy and security risks were found to be the significant factors that impacted behavioral intent. No associations were found between behavioral intent and age or sex, but a partial association was found between prior experience with wearable fitness trackers and the behavioral intent to use them in the future. There is strong support for positive behavioral intent to use wearable fitness trackers among Jamaicans (Kingston and St. Andrew). Effort expectancy, facilitating conditions, performance expectancy, and hedonic motivation were found to be positively associated with behavioral intent while security concerns were found to be negatively associated.

AN ANALYSIS OF STUDENTS' PERCEPTION OF THE EFFECT OF CLASSROOM TECHNOLOGY USE ON THEIR BEHAVIOUR AND INSTRUCTIONAL QUALITY AT A HIGHER EDUCATIONAL INSTITUTION IN JAMAICA

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Access to computers in the classroom has increased over the years especially among the younger generation of millennials. Higher Educational Institutions constantly try to remain competitive and appealing by improving the learning outcomes of their students. Current literature on the use of classroom technology suggests that its addition as an aid to conventional teaching and learning activities has the potential to increase efficiency and produce a more effective form of learning (Lei, 2010). This is achieved by transforming the existing learning environment from passive to active and thereby giving the student more control of said interactions and environment.

"This exploratory survey study sought to investigate University students' perception of the effect of classroom technology use on their behaviour and instructional quality. The research was guided buy three research questions. 1) What is an appropriate framework to assess the level of technology in use in a university classroom? 2) What are students' perceptions of the effect of high technology use in the classroom on the behaviour of students and the instructional quality? 3) What are students' perceptions of the effect of low technology use in the classroom on the behaviour of students and the instructional quality?"

Using a quantitative approach data was collected via questionnaires administered among 4 lecturers and 151 students. The data was analysed using descriptive statistics. The results revealed that the inclusion of classroom technology in the curriculum and delivery of a course will result in students having a positive perception toward the learning process, their lecturers and the course in general. The results also imply that the inclusion of technology in courses will impact student behaviours such as the time they spend studying, their motivation to attend classes and their willingness to participate in the classroom. The

results and recommendations coming out of this research will provide the foundation for future and more extensive work in this subject area. The study also has the potential to inform University administrators and members of Faculty as they seek to make decisions about technology use in higher education classrooms.

COMMUNITY CENTRE DESIGN AND FUNCTION: AN INVESTIGATIVE STUDY INTO URBAN COMMUNITY CENTRES IN THE KINGSTON METROPOLITAN AREA

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“This research provides a case study which examines the design and function of community centres in the Kingston area. The study seeks to determine the extent to which the design of these facilities suits their function and general needs of the community.”

The research however, was not aimed towards devising a one-solution fix all design for community centres or community institutions, but rather to give an in-depth insight into the complex nature of these communal spaces. The study adopted a mixed method approach to examine the social institutions which impact on social interaction in community centres in the respective study area; Fletchers land and Trench Town in the Kingston Metropolitan Area. The mixed methods approach involves qualitative and quantitative approaches.

The findings revealed that the majority of the community residents are aware of the community centres within their communities, and their histories but they themselves underutilize the centres rendering them unkempt and inadequately used.

Further questioning whether or not community centres are living spaces or becoming dead zones in its physical and social usage. Furthermore, the findings showed that majority of the centres were governed by community members, while a small amount by various organizations Non-Governmental Organization (NGO) and other Civil Society groupings. Moreover, the findings also revealed that most of the community residents have a favourable perception of their community centres in terms of believing that it is needed within the community, and that the designs are inviting for persons to use them. The residents are also of the opinion that the centres are appropriate venues for meetings and social interactions. However, the technical review on each centre identified that there was a genuine misconception of the purpose of the centre and its usage.

DEVELOPMENT OF THE PRACTICE OF ARCHITECTURE IN JAMAICA FROM 1976-2016: JAMAICA FIRMS, DESIGN AND PROFESSIONAL DEVELOPMENT.

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The overall aim of this research project is to enable an understanding of the changes that have taken place, throughout the recent history of modern architectural practice in Jamaica from 1976-2016. The study focuses on: the impacts of the economic and political changes, and also Architectural training and registration, on the profession in Jamaica.

> **“This research looks at the architectural practice, under selected themes as they relate to the major impacts during the 1970s to 2010s. These themes include: key influences on the profession, architectural design and professional practice, which are further expanded to specific sub themes.”**

The research focuses on three topics and their influences throughout the period. These topics include: Democratic Socialism between 1980 and 2016. From the research two major outcomes were found. In the first place, the practice of Architecture has undergone a major transition in order to localize the profession with the transition from foreign Architects to local trained Architects. In the second place the profession has shown a strong sensitivity to political and economic influences with the shift in focus from social and community development under the democratic socialism government to a focus on commercial development through capitalism.

GROWING OUR OWN FUTURE: LOOKING AT SUSTAINABLE CITY THROUGH URBAN FARMING

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> **Despite the favourable climatic conditions that exist within the Caribbean, the region has experienced an increasing lack of food and nutrition security.**

Many countries in the region maintain an unhealthy dependency upon imported food products, increasing both economic and social hardship. The year 2008 demonstrated the fragility of the global food markets and the devastating effects that changes like these can have on Small Island Developing States. Paired with a growing rural to urban migration, agriculture and traditional food systems are failing in Jamaica and the urban areas are left vulnerable to food shortages and price increases. This study looks at the possibility of reconnecting the urban areas with food production, reducing food miles and our dependency on imports. The possibility of regenerating urban communities through economic and social development, promoted through the development of a new industry is analysed. The concept of urban agriculture focuses on creating networks within cities where agriculture and the city work in symbiosis, each one providing inputs for the other increasing overall efficiency.

The study aims to answer the question, can urban agriculture improve our cities, benefit our people and promote growth from the ground up ?

RECLAIMED MATERIAL LIFECYCLE IN LOCAL BUILDING WORKS AND THE IMPLICATIONS FOR ARCHITECTURE

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“This study evaluates the use of reclaimed materials (timber, plastic, ISO metal shipping containers) in building works.”

Architecture is a discipline of social, environmental and economic responsibility. Buildings consume at least 40% of energy worldwide and therefore require more sustainable practices. The reclaimed material can either be defined as recycling, down-cycling or up-cycling, where it serves the purpose of redirecting waste material from landfill.

Responsible material use ideally ought to consider a cradle-cradle purpose where no waste is created.

The literature reviewed explored the issues of extending the lifecycle through the “cradle-to-cradle” process by using different design criteria for salvaged material. Design teams would therefore be required to modify and examine the changes necessary in design principles if salvaged materials are opted to be incorporated in building works. Case studies were conducted to evaluate how timber, plastics and ISO containers are recycled and used in building works locally. Salvaged and reclaimed material markets could be established, which could contribute to more sustainable building works if efforts are made by the local governmental to establish a waste recycling process.

DEVELOPMENT OF CHROMATOGRAPHIC METHOD FOR THE SIMULTANEOUS DETERMINATION OF SALBUTAMOL SULPHATE, ETOFYLLINE, BROMHEXINE HYDROCHLORIDE IN PHARMACEUTICAL PREPARATIONS

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"The World Health Organization (WHO) reported that millions of people are suffering from respiratory illnesses. There are many multi-component pharmaceutical preparations for the management of these illnesses."

One of the treatments is salbutamol sulphate, etofylline, and bromhexine hydrochloride combination products. No pharmacopoeia method can be found for the simultaneous determination of this three-drug combination. Accurate estimation of this three-drug combination is very important for the clinical outcome and quality of life of patients. Therefore, a reliable and simple method is required and desirable for the routine analysis of this ternary mixture.

A simple, specific, accurate, and precise reversed-phase high performance liquid chromatographic (HPLC) method was developed for the simultaneous determination of salbutomol sulphate, etofylline and bromhexine hydrochloride in pharmaceutical formulations.

Separations were carried out on a C18 column using gradient elution with methanol and phosphate buffer pH 4 at 1.0ml/min. Detection was carried out at 225 nm for salbutamol sulphate and 247 nm for etofylline and bromhexine hydrochloride with retention times of 3, 4.5, and 12.3 minutes, respectively. The method was validated as per International Conference on Harmonisation (ICH) guidelines and satisfied all acceptance criteria. The linearity plots for salbutamol sulphate, etofylline, and bromhexine hydrochloride in combination were linear with R2>0.999. The accuracy of the developed method for salbutomol sulphate, etofylline and bromhexine hydrochloride in combination were 100.021%, 100.008%, and

100.021%, respectively. The relative standard deviation of repeatability of the system for all three drugs was <2.0%. The developed method had also demonstrated reproducibility in an interlaboratory study. The limit of detection and limit of quantitation were estimated and the method was fit for purpose. Therefore, this method can be used for routine analysis and quality control of pharmaceutical formulations containing all or any of the three active pharmaceutical ingredients.

CURRENT PRACTICES OF HEALTHCARE PRACTITIONERS IN ASSESSING MODIFIABLE RISK FACTORS IN USERS OF ATYPICAL ANTIPSYCHOTICS

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Antipsychotics are used to treat mental disorders, improving patients' ability to function in society. The use of atypical antipsychotics have become widespread, but the cause metabolic abnormalities, including weight gain and hyperglycemia.

"This study was undertaken to assess the practices healthcare practitioners in screening and monitoring modifiable risk factors in users of atypical antipsychotics at the Bellevue Hospital in Jamaica. This study involved a cross-sectional survey of 30 healthcare practitioners and 28 patients, and a retrospective longitudinal review of the patients' medical records over a 5-year period."

Self-administered questionnaires, interviews and an assessment form were used to gather data on baseline tests and parameters monitored. The Senior Medical Officer was interviewed using a checklist to determine the existence of protocols at that institution. Ethical approval and participants' consents were obtained for the study. Statistical Package for the Social Sciences version 20.0 was utilized for data analysis. Screening and monitoring rates were calculated and stratified according to the atypical antipsychotic, age and gender for each parameter. Findings revealed screening and monitoring for personal medical history and weight were minimal (<50%), but absent for family medical history, body mass index, waist circumference and glycated hemoglobin. Screening for fasting or random blood glucose was moderate (≥50% but <70%) to high (≥80% but <90%). Approximately 70% of healthcare practitioners reported advising patients about diet and exercise, but this was undocumented. Patients stated that advice/education about medication, side effects and diet was minimal but moderate for exercise. Protocols governing atypical antipsychotics usage did not exist.

More should be done at the Bellevue Hospital to assess patients taking atypical antipsychotics for modifiable metabolic risk factors.

Screening and monitoring are essential to enable preventative and remedial interventions. Protocols governing screening, monitoring and education of patients to prevent/reduce modifiable metabolic risk factors should be developed and implemented for consistency of care and clinical benefits.

MODIFICATION AND PHYSICOCHEMICAL ANALYSIS OF STARCH OBTAINED FROM ARTOCARPUS ALTILIS (BREADFRUIT)

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"Starch is one of the top 10 excipients used in pharmaceutical formulations, and forms 20% of the mass of fresh breadfruit. Direct compression is the preferred method of manufacturing tablets. Native starches, however, tend to possess poor intrinsic compressibility, making them less suitable as direct compression excipients."

In this study, pregelatinization and carbomethylation starches were analysed for binding and disintegrant functionality, respectively, in directly compressed metronidazole tablets. Fundamental and physicochemical properties of the modified starches were determined. **The crushing strength, friability, disintegration time and dissolution rates of the tablets were assessed. Breadfruit starch was pregelatinized by heating an aqueous slurry for 30 minutes at 65oC**.

Carbomethylation was achieved by alkalization of an alcoholic slurry of breadfruit starch followed by reaction with sodium monochloroacetate. Both modification methods resulted in increased particle size as well as improved flow and physicochemical properties of breadfruit starch. Assessment of compaction characteristics revealed that native breadfruit starch (NBS) and pregelatinized corn starch (PBS) showed comparatively more plastic deformation than native corn starch (NCS) and pregelatinized corn starch (Starch 1500) which exhibited more elastic deformation. Metronidazole tablets containing 20% PBS binder had a mean crushing strength and friability of 55.2 ± 2.7 N and 3.71%, respectively. Analysis of variance revealed seconds with PBS and Starch 1500 as binders, respectively. Analysis of variance revealed no significant differences in drug release, as indicated by dissolution parameters. All formulations met Pharmacopoeia requirements for immediate release tablets, suggesting that PBS may be substituted for Starch 1500. Sodium carboxymethyl breadfruit starch (SCBS) exhibited a significant increase in moisture sorption and hydration capacity compared to NBS. Compared to formulations containing 1% sodium starch glycolate (SSG), there was no significant difference in the crushing strength of tablets containing 1%

SCBS. At 1% concentration, disintegration times were 63±5 and 73±9 seconds with SSG and SCBS as disintegrants, respectively. There was also a positive correlation between SCBS concentration and tablet disintegration time. ANOVA revealed no significant differences in drug release among the formulations with different disintegrant concentrations or the positive and negative controls, as indicated by dissolution parameters.

All tablet formulations met the United States Pharmacopeia drug release requirements for immediate release tablets.

AN EVALUATIVE FRAMEWORK AND MAPPING MECHANISM FOR EVALUATING SERVICE ORIENTED ARCHITECTURE GOVERNANCE FOR GOVERNMENT AGENCIES

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In today's fast-paced, Internet enabled environment, public sector information system level of compliance, flexibility, ease of implementation, interoperability, scalability, and change management have become an important vehicle for e-government success.

> **"A popular approach for dealing with compliance, flexibility, ease of implementation, interoperability, scalability, change management and other issues is the implementation of enterprise architecture (EA) programs in many public agencies."**

The goal of EA is the full articulation of all levels of an enterprise, integrating the strategic and business processes with the information, technology and data systems that enable them. This paper proposed an evaluative framework to evaluate government agencies level of compliance, flexibility, ease of implementation, interoperability, scalability, and change management EA standard. In addition, we proposed a mapping mechanism to map existing modules, workflows and architectures of existing systems in government agencies.

Decision makers in public organizations can use the result of this study to analyze existing approaches to EA frameworks, and their applicability to Service Oriented Architecture (SOA) scenarios and public sector agencies, in particular.

THE READINESS OF THE JAMAICAN POPULACE TO USE MOBILE TELEPHONY TO SUPPORT NON-COMMUNICABLE DISEASE (NCD) SURVEILLANCE: AN M-HEALTH STUDY WITHIN THE SOUTH EAST REGIONAL HEALTH AUTHORITY (SERHA)

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“The World Health Organization (WHO), the World Bank, and the Ministry of Health in Jamaica, underscored the need for strengthening the surveillance of non-communicable diseases (NCDs) in Jamaica. Mobile telephony, a technology that has seen tremendous proliferation has the technological potential to address some of the deficiencies extant in NCD surveillance in Jamaica.”

However, very little literature on Jamaicans’ attitude of behavioral intent towards using mobile telephony in relation to NCD surveillance exists. The purpose of the study was to investigate the extent to which Jamaicans have the behavioral intent to self-report personal health data using mobile telephony and to determine what demographic and technology acceptance factors influence these intentions. The study used a quantitative cross-sectional survey approach with a quota based sample of persons from the adult population in Kingston, St. Andrew and St. Catherine.

Variables in our hypothetical model were derived from a combination of the most relevant variables used in the Unified Theory of Acceptance and Use of Technology (UTAUT) and Hyderabad Institute of Technology and Management (HITAM) technology acceptance models.

Binomial logistic regression was used to examine the relationships in our hypothetical model and Cochran-Armitage test of trend to identify relationships between demographic characteristics and behavioral intent. Finally, descriptive statistics were used to assess the extent of behavioral intent to self-report personal health data. One hundred and two (102) respondents out of 127 (80%) of the sample, had a positive behavioral intent to self-report personal health data using mobile telephony, e.g. blood pressure and blood sugar data 88.1% and 85.8% respectively. Health status, Facilitating Conditions and Performance Expectancy were the significant technology acceptance variables affecting behavioral intent based on our hypothetical model. Finally, education and age were positively associated with the intent to report body weight, blood sugar and geographic location, e.g. Education impacts self-reporting weight ($p = 0.013$, score = 6.172) and age impacts self-reporting geolocation ($p = 0.000$, score = 14.850). There is strong support for positive behavioral intent to self-report personal health data using mobile telephony for NCD surveillance (80%) and that health status primarily and facilitating conditions secondarily, are most significant considerations.

INVESTIGATING WORK-INTEGRATED LEARNING (WIL): A STUDY OF THE PROBLEM-BASED LEARNING APPROACH OF SAPNA FROM 2011 TO 2014.

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> **A disparity exists between the skill sets universities are equipping graduates with and what industries are demanding.**

Literature puts forward Work-Integrated Learning (WIL) as a key instrument in addressing this divide. Problem-Based Learning as a variant of WIL is a new phenomenon in Jamaica and little is known of its implementation and impact.

This study sought to explore the PBL approach employed by the SAPNA lab at the University of Technology, Jamaica to ascertain its impact on student work readiness.

This research employed a retrospective survey design and the findings suggest that PBL has a positive impact on the development of work readiness in students. The study also provides evidence to support the fact that activities within such environments need to be authentic, and proper alignment and assessment structures need to be in place for the experience to be most impactful.

AN EXPLORATORY STUDY OF ADAPTATION TO AGILE SOFTWARE DEVELOPMENT METHODOLOGIES BY ORGANIZATIONS IN JAMAICA

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The challenges experienced in developing software systems led to a change from traditional software methods, like 'Waterfall' to more contemporary, flexible and intuitive software methods, like 'Agile'. Due the unique nature of Agile Software Methods, an adaptation to its methods is not a simple process and as such must be managed in a sustainable way. Agile Software methods have become an established process for developing software and are considered to be relatively quick to be most efficient. Agile Software methods have captured the attention of software practitioners leading to the high demand of its use. Consequently, practitioners are investigating why these Agile Software development Methods have proven more successful than the traditional software methods.

> **"The current literature suggests that Agile Software Development Methods are indeed more effective in producing software products quicker, while meeting customer satisfaction. Agile Methods caters to the complexity of modern software systems and the rapidly changing business environment."**

The lack of knowledge of the transition phases that Jamaican organizations go through during the adaption of Agile software methods has been highlighted by others.

The results of a qualitative case study revealed various phases of transition to be considered as achieving a successful adaption of Agile Software Development methods. The transition consists of five (5) phases as listed in the order of importance: Management buy-in; Integrating Agile Practices; Training; Agile Pilot Projects; and Implementation.

During the various phases, organizations face challenges, of which, mindset, commitment, culture, lack of trust in adapting Agile, management involvement, lack of cooperation, and collaboration, have been identified as being the most prominent.

TOWARDS A HIGH INTERACTION DYNAMIC AND INTELLIGENT HONEYPOT FRAMEWORK FOR SDNS.

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Year Submitted:
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Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

“This research represents a novel proof of concept quantitative case study on the application of honeypots as an integration within software defined networks (SDNs). Specifically, the work sought to answer two research questions and they are as follows (i) what is a suitable conceptual honeypot framework for tracking malicious insider threat activities within a software defined network? (ii) How does one evaluate the framework outlined in question one above?”

As outcomes of this research work, our contributions we believe are novel, as up to the time of writing this submission, we found no other literary works that compare. We itemize these contributions as follows (a) we developed a unified conceptual honeypot framework (using new data collection, data classification analysis) for the security monitoring of the SDN. The output results of the data collection and data classification analysis processes are visualized as a form of basic data reporting required by our SDN in order to support system administrative teas responsible for the security of these environments. The honeypots provide a useful source of logging as an approach to tracking potentially suspect malicious traffic to the SDN system administration environment; (b) we designed our own enterprise size SDN container test environments with simulated production services, and trusted virtual machines for which we ran low interaction honeypots in order to achieve the SDN honeypot logging requirement outlined above; (c) we performed attack simulation production studies using distributed denial of service attacks and password attacks on our unencrypted packer traffic flows within our test SDN environment; (d) we provided detailed experimental log analysis correlation studies within the SDN in order to corroborate or disprove the potential threat sources to our SDN; (e) we developed a set of SDN honeypot security logging policies as it relates to data collection and data analysis as a part of the basic assumptions on how we track potentially suspicious malicious ingress traffic within the SDN. Based on our research, there is already sufficient literature that supports egress firewall policies to manage the data and control planes within the SDN against intruder attacks and hence this was not taken into account as a part of this work.

For the purposes of this study, malicious insider threats assume potential evidence of a Distributed Denial of Service Attack or a password attack as detected by our SDN honeypot logs running within the IT Security Officer led environment. In a broader context, we believe that our studies provide a rich addition to the security literature for Software Defined Networks as it relates to the use of honeypots to track would be attackers within the areas of Software Defined Network Auditing and Digital Forensics.

AN INVESTIGATION INTO THE USE OF MULTI-BIOMETRIC TECHNOLOGY FOR SECURING ONLINE EXAMS IN JAMAICAN UNIVERSITIES: THE PERCEPTION OF STUDENTS AND ADMINISTRATORS

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MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

"This study investigated the perception of students and administrators regarding the use of multi-biometric technologies to secure online exams. The overall objective of the research was to discover from respondents' their knowledge of biometric technology, their acceptance level and concerns they may have towards using biometric technology, their acceptance of level and concerns they may have towards using biometric technology."

A mixed-method approach was used to conduct this study and a triangulation design was used to compare both the qualitative and quantitative data. One-on-one semi-structured interviews were held with the University Council of Jamaica (UCJ) and the University of Technology, Jamaica (UTech) administrators. Two questionnaires were used to collect quantitative data from students and administrators, two hundred and five students and sixty-three administrators from UTech and the Northern Caribbean University (NCU) completed the research questionnaires. A focus group discussion was also conducted with 13 students from UTech who were enrolled as fully online students. A total of 288 persons participated in this study.

The research findings reveal university administrators view the collection of student's biometric data for securing online exams as having beneficial implications for their university and it could possibly help to improve their university distance learning programmes' integrity. The findings also reveal that students had mixed reactions towards giving their biometric data to their university

for online exam authentication. The study reveals that students were aware of the benefits of using biometric technologies and do appreciate the reasons for such implementation such as being able to uniquely identify students.

However, the majority of the students reported that they have concerns about their privacy. They also have concerns about how their biometric data will be stored, protected and used if they were asked to provide such information by their university. The accreditation body UCJ highlighted similar concerns about the storage and protection of student's biometric date; they believe the government of Jamaica can develop laws to address student data protection in an educational environment where biometric technology could be utilized. The findings of the qualitative and quantitative data reveal that fingerprint technology was the preferred biometric authentication technology students were willing to provide and administrators believe fingerprint is the most appropriate biometric characteristic to accept from students. The research study concludes by offering implications for higher education institution, conclusion and future research.

SELF-DISCLOSURE ON SOCIAL MEDIA: AN INVESTIGATION FOR PREDICTORS OF SELF-DISCLOSURE BEHAVIOUR IN SOCIAL MEDIA IN DEVELOPING COUNTRIES CASE: JAMAICA

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Year Submitted:
2017

Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

Social media has rapidly become a popular virtual meeting place for people around the world, with individuals from developing countries increasingly spending more time interacting and self-disclosing online with both known and unknown people. These disclosures on social media sites have led to an increased interest in how much information individuals reveal and share about themselves.

“This study seeks to investigate the predictors of self-disclosure behavior with the aim to explain why people self-disclose on social media sites. This research will examine factors that cause individuals to self-disclose on social media sites such as Facebook, Instagram and Snapchat – under an integrated theoretical framework, in a developing country. By examining this phenomenon in a new context, this study seeks to provide an understanding of self-disclosure in a new setting and validate previous research on self-disclosure in social media context.”

An integrated model that incorporates the extended privacy calculus model and the extended unified theory of acceptance and use of technology (UTAUT2) model will be used to conduct the investigation. A quantitative research approach was used to collect data from social media users in Jamaica, a total of (n=150) survey instruments were used in the analysis. Data was analyzed by using descriptive statistics. Thereafter an exploratory factor analysis (EFA) was conducted in order to gain construct validity and arrive at a suitable factor solution. The results indicated that Privacy concerns, Perceived Benefits, Self-Efficacy, Social Influence, and Habit all had a significant effect on Self-Disclosure.

AN INVESTIGATIVE STUDY ON THE IMPACT OF THE ONLINE APPOINTMENT SCHEDULING SYSTEM AND THE PHARM PARTNER SYSTEM TO USERS QUALITY OF WORKING LIFE IN THE HEALTH CARE FACILITIES AT THE UNIVERSITY OF TECHNOLOGY, JAMAICA.

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2017

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“University of Technology, Jamaica implanted technologies in its health care facilities to better serve the staff and patients. The purpose of this study was to investigate the impact of these technologies on the quality of working life for users in a small healthcare environment at the University of Technology, Jamaica and add to the body of knowledge for future research on this topic. Both qualitative and quantitative methods were employed.”

Two instruments were: interviews and survey forms. Healthcare facilities at the University of Technology, Jamaica were studied. Sample size were Health Clinic staff (N= 9), Pharmacy staff (N= 8), University general staff, students and lectures (N= 153). The investigation covered a one (1) year period. The Statistical Package for the Social Sciences software version 24.0 was and NVivo software were used for data entry and analysis of the surveys and interviews respectively. The overall experiences using the systems were as followed. Kruskal Wallis nonparametric test, Rank Mean table review, general users of the online appointment scheduling system P value = 0.230, Health Clinic staff P value = 0.254 and Pharmacy staff P value = 0.365. Null-hypothesis of $P<0.05$, the main roles/positions answers were the same, no statistical difference in the answer for the different roles of person surveyed. SPSS frequency test for general users of the online appointment scheduling system overall experience, 41.50% Very Good, 27.89% Good, 17.69% Satisfactory, 9.52% Excellent and 3.40% Poor. Health Clinic staff, 66.67%, Very Good, 11.11% Good, Excellent and Satisfactory, respectively. The Pharmacy staff, 37.50% Satisfactory, 25.00% Very Good and Good, respectively.

The findings supported that the systems improved users’ quality of working life. Reduced waiting time for patients to access doctors and receive their prescription from

both facilities. Pharmacists were able to disburse drugs to patients at a faster rate. Most manual functions at both facilities were automated: the retrieval of patient's appointment scheduled information at health clinic and the retrieval of patient's records at the pharmacy. Pharmacy inventory system was automated, patients at the health clinic were able to go online and see doctors available for appointments.

COMPARATIVE STUDY ON THE EXPECTED AND ACTUAL OUTPUT OF THE JPS/UTECH, JA. 100KW PHOTOVOLTAIC ENERGY SYSTEM

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Year Submitted:
2017

Degree:
MASTER OF SCIENCE (M.SC.) IN RENEWABLE ENERGY ENGINEERING

The general trend for energy security is through energy diversity especially for non-petroleum producing countries. Energy security relates to minimizing disruptions in energy supply and price volatility.

Jamaica is an importer of petroleum products and, given that one of the goals of the Jamaica's National Energy Policy 2009-2030 includes the use of renewable energy resources up to 20% of installed capacity by 2030, several government and private sector institutions have embarked upon the objective of reducing their dependency upon fossil fuel based energy sources and have turned to renewable resources.

"Wind energy has so far been the leading renewable energy source in Jamaica, however, there has been increasing use of solar PV at the small and medium scale. In 2014, the Jamaica Public Service (JPS) and the University of Technology, Jamaica (UTech, Ja), entered into an arrangement that saw the gifting of a 100kW PV energy system to the university."

The PV energy system is comprised of three separate installations: 5kW ground mounted on the front lawn, 40kW on the roof of the School of Engineering Building (SOE), 55kW on the roof of the Faculty of Education and Liberal Studies (FELS). Since the commissioning in 2014, the 100kW PV energy system has significantly impacted the electric utility bill of UTech. The findings of this work aim to reduce investment skepticism in similar Grid-Tied PV systems as per the 100kW PV Energy System installed at the UTech, Jamaica. These findings should aid in understanding the impact of ambient temperature on the efficiency of PV energy systems in similar climatic conditions.

CONTRAINDICATIONS TO METFORMIN PRESCRIBING IN PATIENTS WITH TYPE 2 DIABETES MELLITUS ON THE PUBLIC WARDS AT THE PRINCESS MARGARET HOSPITAL, NASSAU BAHAMAS.

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Year Submitted:
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POST BACCALAUREATE DOCTOR OF PHARMACY (PHARM. D)

“The purpose of this research was to identify and categorize contraindications in patients with Type 2 diabetes mellitus prescribed metformin and to examine prescribing practices to its use as it relates to the study population.”

This study was cross sectional in design. Medical records for 103 adult patients with Type 2 diabetes mellitus prescribed metformin were reviewed for contraindications. The patients were admitted to one of the adult public wards at the Princess Margaret Hospital during the period of February 15th 2016 to August 15th 2016. A data collection sheet was used to gather information from the patient’s records. Contraindications were identified and physicians were contacted in order for an intervention to be made. Major findings of the study were that 69 (67%) females and 34 (33%) males made up the study population. Fifty-four (54) patients had a mean BMI of 30.8kg/m2 ± 7.8 and 66 patients reported a mean Hba l c of 8.7% ±2.7. A total of 22 contraindications were identified in 20 (19.4%) patients in this study. Elevated serum creatinine (Scr) was the most prevalent contraindication in 14 (70%) out of 20 patients. Statistical significance was seen as it relates to females without contraindications (mean 1.4 mg/dL versus 0.84 mg/dL; p value 0.003; CI 95%). The other categories of contraindications present, congestive heart failure and elevated serum creatinine (7.7 mg/dl and 1.6 mg/dl respectively). Metformin was continued in 7 patients 35%) withheld in 8 patients (40%) and discontinued in 5 patients (25%). In conclusion, 22 contraindications were identified in 20 (19.4%) Type 2 diabetes patients prescribed metformin.

This study is beneficial because metformin is the first line drug of choice for Type 2 diabetes treatment and its contraindications has always been debatable. The results of this study can be used in the Bahamas based on the new recommendations for metformin contraindications.

ASSESSMENT OF SPACER AND ASTHMA ACTION PLAN USAGE IN ASTHMA MANAGEMENT AT THE BUSTAMANTE HOSPITAL FOR CHILDREN

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Year Submitted:
2016

Degree:
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The use of spacers with metered dose inhalers (MDIs) and written asthma action plans are considered important tools for effective management of asthma in children.

> **"This research assesses spacer and asthma action plan usage in asthma management at the Bustamante Hospital of Children (BHC). The researcher sought to determine; the percentage of children with asthma at BHC medical clinic that utilize a spacer with a MDI; the extent to which inhalation technique differ from required standards; the prevalence of the use of an asthma action plan; caregivers' perceptions of asthma action plans and physicians' perceptions of the use of spacers and asthma action plans."**

Participants were comprised of 50 caregivers of children with asthma at BHC medical clinic and 6 physicians. A cross-sectional study was conducted which employed purposive sampling. Questionnaires and interviews were used to collect data over the period June to August 2016. Data was analyzed using the SPSS version 21 software. The findings showed that spacers were used at least a few of the times by 46 (92%) caregivers but were always used by only 25 (50%). Majority of the caregivers (n=49, 98%) did not demonstrate all the required steps of proper inhalation technique. There was an average number of caregivers (n=37, 74%) who owned an asthma action plan but its use was low. This tool was viewed positively by 26 of them. All 6 physicians perceived the use of spacers and asthma action plans as important and beneficial for the management of asthma in children.

The findings of this study are not generalizable due to the small sample size but reveal the need for routine educational training sessions on spacers and asthma action plans.

18.9% had Poor Management. Participants had the highest scores in MM and the lowest in IM. There were no significant findings between gender or age group with respect to specific subscales. However, the data showed significant differences in the response to individual questions. Therefore, for participants to obtain an ESM Score of Excellent all areas of self-management must be addressed and managed properly. The implementation of an Epileptic Self-Management Protocol at PMH may be beneficial in assisting epileptic patients to improve their overall ESM Score from Moderately Managed (51%-70%) to being Excellently Managed (>90%).

AN EVALUATION OF MEDICATION ADHERENCE AND SELF-MANAGEMENT TECHNIQUES IN PATIENTS WITH EPILEPSY AT THE PRINCESS MARGARET HOSPITAL IN NASSAU, BAHAMAS

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ONYX FLOWERS-RUSSELL

Supervisor:
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Year Submitted:
2016

Degree:
DOCTORATE OF PHARMACY (PHARM. D)

Epilepsy is a neurological disorder that affects millions of people worldwide. In The Bahamas and estimated one percent of the population may be afflicted with this condition. The majority of the epileptic patients are managed at the Neurology Clinic at the Princess Margaret Hospital. Presently newly diagnosed and chronic epileptic patients are seen at the follow-up clinic. To date there has been no formal assessment to determine if patients are adequately managed not only on their medication but assessed for all aspects of their self-management.

> **"The study sought to assess five specific areas of self-management, in patients with no medication changes within 6months to determine which if any behavioral adjustments are needed with epilepsy at Princess Margaret Hospital in Nassau, Bahamas. This study was conducted as cross-sectional quantitative study with convenience sampling at the Princess Margaret Hospital (PMH)-Neurology Clinic."**

Participants were selected by convenience sampling and asked to complete an Epileptic Self-Management Scale (ESMS) Survey. The survey developed by Dilorio 1997, consisting of 42 questions that addressed all five areas of self-management (i.e. Information, Lifestyle, Medication, Safety and Seizure Management). Each question had a maximum score of 5 based on the following scale: never =1, rarely =2, sometimes =3, most of the time =4, and always =5. The data was analyzed using SPSS 24.0 to give an overall percentage rating of either Poor Management (<50%), Moderate Management (51-70%), Good Management (71-90%) or Excellent Management (90%). Using Spearman's Correlation, significant findings ($p<0.05$) were used to determine if there was any relationship between the subscales in the ESMS and the established age groups and gender. The data of 53 participants were analyzed, 18.9% showed Good Management, 62.3% showed Moderate Management and

DECOUPLING THE ISSUE OF THE DETERMINANTS OF EXECUTIVE COMPENSATION AND ANSWERING THE QUESTION: ARE CHIEF EXECUTIVE OFFICERS BEING UNDERPAID?

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Year Submitted:
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Degree:
DOCTOR OF PHILOSOPHY (PH.D.) IN BUSINESS ADMINISTRATION (ACCOUNTING)

This study investigates the adequacy of CEO compensation from the perspective of using accounting measures to assess the performance of CEOs. The main objective of this research is to determine to what extent compensation packages received by USA CEOs represent an underpayment of CEOs based on the performance of their firms when firm performance is defined in terms of accounting measures.

"This study, which has implications for corporate governance and CEO compensation decisions, is motivated by the broad global interest in both corporate governance and CEO compensation especially against the background that for the last two decades there is this well-established popular view presented in the current CEO compensation literature which describes CEOs as receiving widespread excessive and unjustified compensation packages."

CEO compensation data are obtained from Compustat, 10K SEC filings and Forbes listing of CEO data. The analysis covers a two-phased time period i.e., before and after the financial crisis in the USA. CEO compensation data are analyzed for the years 2004, 2005, 2006, and 2007 (pre-financial crisis) and for years 2009 to 2013 (post financial crisis).
Compensation data for the years represent the highest paid CEOs for the year. Multiple regression models consisting of six accounting performance measures are used to perform the analysis to determine the extent of CEO underpayment or overpayment. The accounting measures are obtained from the companies 10K SEC filings and from Compustat database. Hypotheses that are derived from the literature and my research question are tested to determine the extent of CEO underpayment. Having examined 1151 CEO compensation packages to determine if CEO underpayment exists in light of what is an overwhelming literature supporting CEO overpayment, the results show that 67.33% of the CEOs were in fact underpaid based on their firms performance, and only 32.67% (376 CEOs) were overpaid based on firm performance. This study presents a new direction to the discussion of the current debate on CEO compensation. The mainstream approach of presenting CEO

compensation packages as excessive and unjust is no longer plausible. The implications are broad both from the perspective of the methodology and the findings notwithstanding that the data used are based on the USA. From a theoretical perspective, the question of why CEOs are underpaid requires detail analysis of effectiveness of compensation committees. Implications for Jamaica, and more broadly, the Caribbean are presented.

TRANSFORMING THE CITY OF KINGSTON, JAMAICA INTO A SUSTAINABLE CITY THROUGH GREEN/ENERGY EFFICIENT BUILDING DESIGN

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Year Submitted:
2016

Degree:
MASTER OF ARCHITECTURE (M. ARCH.)

Today, countries worldwide are experiencing the increasingly severe impacts of climate change due to years of man's continuously unsustainable developments. These impacts include rising seas levels, pollution, more frequent and severe extreme weather events; and rely on costly environmentally unfriendly fossil fuels as our primary sources of energy for electricity and transportation. The main culprits behind these poor conditions are our cities. While cities make for only two percent of the world's land area they account for seventy percent of greenhouse gas emissions (World Bank, 2014). Greenhouse gas emissions are the main drivers of anthropogenic climate change (World Bank, 2014); therefore, there is a global urgency to make cities more sustainable, ecologically based and livable. This is especially important in developing nations as these areas are projected to experience the fastest rate of development. It is estimated that about one-third of global energy is consumed in buildings (Liu, 2014). Consequently, buildings offer an excellent opportunity for increasing energy savings and efficiency. Specifically, by using active and passive design approaches to design buildings, energy savings and efficiency can be increased. Passive design strategies are especially important as they are easy for architects to implement during the design stage. By taking advantage of these strategies our architecture really act as machines for sustainability in cities. Therefore, the aim of this study is to investigate what methods of green, energy efficient design strategies are currently being used for new and existing buildings in Kingston, Jamaica as well as what challenges impede Kingston on its journey to make buildings more energy efficient and transform it into a sustainable city. To complete this task, the United Nations' 2030 Sustainable Development Goals (SDGs) is adopted as a framework for defining sustainable development. Specifically, Goal Eleven for 'Sustainable Cities' and Goal 7 to 'Ensure access to affordable, reliable, sustainable and modern energy for all' are used to define the energy efficiency goals buildings in downtown need to adapt to become sustainable; assess the design efforts that have been made presently in Kingston; and what changes need to be made for the transformation. This study critiques existing exemplary energy efficient buildings in Kingston to identify how they achieved their goal, as well as the challenges and opportunities present to make Kingston sustainable through green design and energy efficiency. It is expected that by carrying out this research practical architectural guidelines for sustainable buildings in Jamaica as well as the Caribbean can be developed.

PLACEMAKING IN THE CARIBBEAN CITY

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The development of Caribbean cities has always been influenced by external factors. Their urban design reflect their past in colonialism and in most there is clear demarcation in the urban fabric, of the effects of the abolition of slavery and American influence in the 20th century. The initial Caribbean city encouraged urban primacy, due to the topographical limitations of the islands as well as access to resources and work along the ports. The abolition of slavery saw the expansion of these cities in a vernacular fashion. This growth, along with the influence of modernist ideals in the 20th century, resulted in urban sprawl, single purpose zoning, indoor-living and loss of public space culture. These factors have further enhanced the socio-economic fragmentation and social stratification that these societies face, and which has been evident since the time of the sugar plantation and the enslavement of Africans.

> **“The study of literature reveals that a place-making approach can be a viable means of resolving some of the issues that Caribbean cities face, as a result of social stratification existing in these societies. Issues such as fear of other, fear of authority, limited diversity and vitality, stunted economy, and increased crime rates. The study looked at public spaces in the cities of Havana, Cuba and Kingston, Jamaica that were considered successful due to being nodes of heavy social activity within each city.”**

Observations, qualitative interviews and surveys conducted to the users of each place in order to understand their draw to these particular places. This study is part of a growing body of research into the benefits of adopting a place-making approach in the Caribbean context and develops a framework or series of guidelines that can create the right conditions for the cultivation of places.

LIVABILITY AND DOWNTOWN KINGSTON – PUBLIC PERCEPTION AND STRATEGIES FOR SURVIVAL

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Year Submitted:
2016

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MASTER OF ARCHITECTURE (M. ARCH.)

Downtown Kingston, Jamaica is known for cultural achievements like the creation of Reggae and Dancehall music while synonymously it has a reputation of being a city that is to be feared. The city of Kingston is a divided unit both along geographical and social lines such as class and race.

> **"The communities in the poorer section of Kingston are often times classified as a 'no go' zone by many outsiders. These outsiders sadly include some neighbouring citizens among the wealthier classes in the more affluent communities of St. Andrew and even those who live outside of the Kingston Metropolitan area."**

The perception of how these residents survive the challenges associated with living in poverty is a divided one among academics, residents and the outsiders. These strategies employed by the residents will be probed by two sets of surveys; 1. "Wide angle – Public" and 2. "Narrow Angle – Residents." These investigations are primarily seeking to firstly discover whether the public share or diverge in their views towards downtown Kingston's state of urban decay. Secondly, regardless of the public's views on livability in downtown Kingston, how do the residents view their circumstances and environs and more importantly how do they navigate around the challenges in order to survive?

These findings will hopefully provide insight into an enigma that many Jamaicans share about what life would be, living in downtown Kingston.

DEVELOPMENT AND VALIDATION OF A CAREER INFORMATION KIT TO MITIGATE DYSFUNCTIONAL CAREER THINKING AMONG SECONDARY SCHOOL STUDENTS IN JAMAICA

Student:
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2016

Degree:
DOCTOR OF PHILOSOPHY (PHD) IN CAREER AND TECHNICAL EDUCATION

“The study focused on empirically establishing the extent of the existence of dysfunctional career thinking in Jamaican secondary schools and developing a Career Information Kit (CIK) for mitigating dysfunctional career thinking among students.”

The study population consisted of one thousand, four hundred and thirty four (1,434) third form students from Kingston and St. Andrew which represent region one (1) of the Ministry of Education school zoning. A sample size of 20% of the entire population was purposively selected from six (6) secondary level institutions, representing the various secondary school types in Jamaica. This included a mix of traditional, non-traditional, technical, all boys, all girls, co-educational, urban and rural schools. Interviews with students and guidance counselors established that dysfunctional career thinking exists in all school types and at the various stages of the career decision making process. Interviewees indicated that the highest levels of dysfunctional career thinking were in the areas of Synthesis and Analysis, respectively. However, based on the overall mean and standard deviation results, there is not a great variation in the stakeholders’ opinions on the level of dysfunctional career thinking in the various categories of the decision making process. The development of both the paper and the digital versions of the CIK underwent rigorous and repeated testing by selected career professionals and students, before it was considered to be reliable and valid.

A guide for using the CIK was also developed. It is recommended that the CIK be utilized in secondary schools and national libraries.

THE IMPACT OF SITUATIONAL AND SOCIAL FACTORS ON ONLINE HEALTH INFORMATION SEEKING BEHAVIOUR IN THE WIDER METROPOLITAN AREA OF JAMAICA

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Year Submitted:
2016

Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

The number of people using the Internet for health information seeking is increasing rapidly. Health related websites and the Internet act as a fast way of getting health information as life changes occur when people are distressed or uncertain. The frequency at which persons who are underserved access health information available online is low, which makes them unaware if basic knowledge about illnesses which may affect them.

> **“There is a need for additional studies that investigate the social and situational factors that impact online health information seeking behavior. In addressing the gap, this study uses the Bodie and Dutta Integrative Model to propose and investigate factors that affect online information seeking behavior seeking behavior namely, age, gender, general health status, health problem, computer literacy and health literacy.”**

A quantitative approach was used with a cross sectional study design in order to identify the impact that specific situational and social factors have on online health information seeking behaviour. Using convenience sampling, a survey was used to gain insights from participants mainly in St. Catherine, Kingston and St. Andrew. The findings revealed that gender, health problems and computer literacy were significant in predicting online health information seeking behavior while age, general health status and health literacy were not in the context. The results of the research has both theoretical and practical implications as it adds to the body of knowledge on factors that impact online health information seeking behavior and provide insight to governing bodies and the healthcare industry.

TOWARDS PREDICTING THE JSE MAIN INDEX MOVEMENTS USING DATA MINING TECHNIQUES

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Year Submitted:
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Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

A stock market plays a vital role in modern economy. It is thought of as being forward-looking and its performance has been traditionally viewed as an indicator of economic activities. A stock market is affected by several internal and external factors. Macroeconomic variables such as the interest rate, inflation rate, money supply exchange rate, remittance flow, gross domestic product growth rate and net international reserves are external factors that are influential to the Jamaica stock market performance.

> **“Accurate predictions of a Stock Market Index as well as an understanding of the relationship between Stock Market and Macroeconomic Variables is relevant in aiding Policy Markers, Investors and Fund Managers in increasing shareholders wealth, which in turn will improve the economy as a whole.”**

Traditional prediction approaches such as technical and fundamental analysis have been found to be limited and produced unsatisfactory outcomes due to its inability to handle the dynamic, non-linear and complex nature of the Stock Market and Macroeconomic data. With the advent of advanced computer systems consisting of high processing power, large storage capacity and with data mining and intelligent algorithms that can process large volumes of data and make complex decisions, Stock market prediction have since moved into the technological realm. This study applied the use of the Cross Industry Standard Process for Data Mining (CRISP) framework integrated with the Arbitrage Price Theory (APT) multi-factor model to predict the likely movement of the JSE Main index using macroeconomic variables as predictors. This study used seventeen (17) years of monthly data from January 1999 to December 2015 to carry out this experiment. Standalone models of the Multi-layered Perception Artificial Neural Network (ANN), Support Vector Machine (SVM) and Decision Trees (DT) and the ensembles; ANN - DT, ANN - SVM, DT-SVM, and ANN - DT – SVM were also compared and evaluated. This study found that ANN-DT was the most suitable model to predict the likely movement of the JSE Main index; and that there was a significant relationship between the JSE Main Index and the Macroeconomic variables studied.

MOBILE BANKING AND FINANCIAL INCLUSION: A MODEL OF ADOPTION FOR MOBILE BANKING BY THE UNBANKED IN JAMAICA.

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ANDRÉ STEVENS

Supervisor:
DR. VANESA TENNANT

Year Submitted:
2016

Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

Financial inclusion is the process of ensuring that all households and businesses, regardless of income level, have access to and can effectively use the appropriate financial services they need to improve their lives.

> **"Despite efforts to promote financial inclusion, majority of the developing world's population is still unbanked. In many developing countries, it is common for a person to have a mobile phone but not a bank account. As such, mobile banking is seen as a potential venue to reach out to the unbanked and getting them financially included."**

However, there tends to be a low adoption among the unbanked. This study investigates factors enabling and inhibiting adoption of mobile banking among the unbanked in Jamaica. It uses a qualitative method of enquiry in thirty individuals from Kingston, St. Catherine, and Clarendon were interviewed to gain insights on the key enablers and inhibitors. From the interviews, the key enablers were: lack of knowledge, perceived security risk, perceived financial cost, complexity and lack of trust.

It is anticipated that this study will add to the body of literature on adoption of mobile banking among the unbanked, and also provide insights to Government and financial institutions on how to effectively implement strategies to include the unbanked sector in mobile banking adoption initiatives.

TOWARDS A MOBILE CROWD-SENSING WITH VIDEO ANALYTICS FRAMEWORK FOR VULNERABILITY MONITORING OF PROPANE CYLINDERS SITUATED WITHIN CAMPUS WIDE NETWORKS

Students:
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ROOSEVELT WILMOT

Supervisor:
DR. SEAN THORPE

Year Submitted:
2016

Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

Within our campus environment, there is a thick distribution of propane cylinders to support various commercial wide activities. The challenge is that as the number of commercial centers grows the number of independent propane service utilities increase. Against this background the need to physically monitor such utilities cannot be understated.

> **"This study examines the use of Mobile Crowd-Sensing (MCS) with the adoption of a Video Analytics framework as an overlay to collate and correlate data with respect to moving and stationary pedestrian and vehicular traffic activities occurring within the proximity of these propane points across the campus."**

We deployed video cameras and aerial drones at these propane deployment points to facilitate the triangulation of data collected at these points. Throughout this work, we refer to these deployment points as hot spots, and the term is used interchangeably as such. We used The Netherlands Organization (TNO) Multi-Energy, and the Trinitrotoluene (TNT) Equivalency models. We compared the models to formulate factual hypothesis about safety zones given an explosion within the proximity of blast ranges around these hot spots. We modeled these safe zones using a set of geospatial toolkits to our aid as defined by our framework. Our observations and findings put into context the seriousness of human safety within these hot spots and how we use the framework to help produce certainty value calculations that inform our hypothesis and inferences made in this work.

TRIBOLOGICAL CHARACTERISTICS OF FORMULATED LUBRICANTS UTILIZING LOCAL PLANTS

Student:
ANDRE L. LINDSAY

Supervisor:
PROF. VERNON E. BUCHANAN

Year Submitted:
2016

Degree:
MASTER OF SCIENCE (M.SC.) IN MECHANICAL ENGINEERING

“This study investigated the use of Ricinus communis (Castor Oil) and Blighia sapida (Ackee Oil) for use as mechanical lubrication and determined whether the tribological properties of the lubricant developed are comparable to typical petroleum-based lubricants.”

In the last two decades, concern and awareness on the use of products derived from petroleum and their adverse impact on the environment have created an opportunity to produce environmental friendly lubricants. The advantages of environmentally advantage products include minimal health and safety risks, and less pollution. Petroleum based oils generally represent potential danger because they are not readily biodegradable and are toxic. Furthermore, there are concerns with fluctuating costs associated with these forms of lubricants. Thus, for these reasons and in response to public awareness, norms that stipulate the use of environment friendly lubricants are desirable. Hence, an opportunity has been created for such lubricant. This paper addresses these concerns by developing an alternative means of lubrication by utilizing environmentally compatible or eco-friendly oils that produced from a volumetric blend of Ricinus communis and Blighia sapida Oils. The lubricant was developed by mixing oils extracted from Castor beans and Ackee fruits in varied proportions. The blends were tested for their viscosity, density friction and wear characteristics. Friction and wear performance tests were conducted on the Plint and Partners Four Wheel Multi Specimen Test Equipment at varying loads (40N – 60 N), constant speed (2709 rpm), and a constant test time of twenty (20) minutes. The variable was the volumetric blend of Castor Oil and Ackee Oil. The results obtained from the viscosity tests indicated that a blend of 75% Castor and 25% Ackee was the best option when compared to the reference lubricant (AmsOil 75W-90), the average percentage difference being 17.5%. This blend was also true for the density comparisons at 40oC, the petroleum based lubricant having a density of 0.8663 g/cm3 and the blend having a density value of 0.9339 g/cm3. The coefficient of friction and wear scar measurements were compared with the reference lubricant. Again, the blend of 75% Castor and 25% Ackee performed best when

compared with the reference lubricant. The maximum difference between the reference lubricant and the blend was 0.02 and 5.7% for the coefficient of friction and the percentage difference in the wear scar length, respectively. The emphasis on environmentally friendly products is largely due to the rapid depletion of world fossil fuel reserves and increasing concern for environmental pollution from excessive mineral oil use and the fluctuating costs associated with petroleum based lubricants, In other words, as petrochemical sources become more expensive, the ability of plant-based products to be cost competitive, or even cost advantageous, will be realized.

The results of the research showed that the plant-based oil performed well against the petroleum based lubricant which already has been enhanced with additives. Thus, further development to the blend of 75% Castor and 25% Ackee by the addition of enhancing additives appears to be attractive, both in terms of performance and the environment.

PHYTOCHEMICAL ANALYSIS OF ENDEMIC PLANTS FROM THE COCKPIT COUNTRY, JAMAICA

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Year Submitted:
2016

Degree:
MASTER OF PHILOSOPHY (MPHIL) IN CHEMISTRY

Natural products have been, are and will continue to be, a major source of new drugs and commercially viable products because they offer great structural diversity. Samples of nine plants endemic to the Cockpit Country of Jamaica were collected to search for new compounds and properties which demonstrate value added, medicinal or agricultural potential, and also to add informative scientific data on traditional plants in Jamaica.

"In this study, the phytochemical constituents of eight endemic plant samples and in vitro antibacterial activity were investigated. The presence of saponins, quinones, steroids and coumarins in their extracts was determined. Antibacterical activity was detected. Verbesina karsticola Proctor is a species from the family Asteraceae. It is an endemic Jamaican shrub that is found in the Cockpit country."

The antimicrobial efficacy of the plant extract was investigated against five pathogenic bacteria, namely: Pseudomonas aeruginosa; Escherichia coli; Staphyloccocus aureus; Bacillus cereus and Bacillus subtilis. Crude extracts were subjected to disc diffusion assay and TLC Bioautography. The results indicated that growth of Bacillus subtilis cereus was inhibited by the plant extract, with a 10 and 11 mm zone of inhibition. Bioautobiography analysis and HPLC gradient elution using a reverse phase c18 semi-prep column, guided the isolation and purification of two bioactive compounds, bornyl caffeate and bornyl coumarate. Their structures were elucidated based on spectroscopic analysis using 1D and 2D Nuclear Magnetic Resonance (NMR) Spectroscopic techniques.

FORMULATION AND IN VITRO STUDIES OF A FIXED-DOSE COMBINATION ANTIHYPERTENSIVE IMMEDIATE RELEASE DOSAGE OF ATENOLOL, ENALAPRIL MALEATE AND HYDROCHLOROTHIAZIDE

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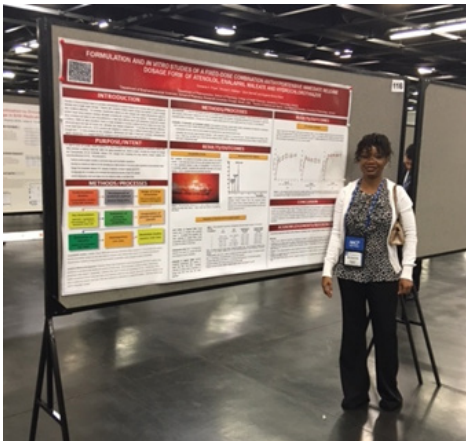
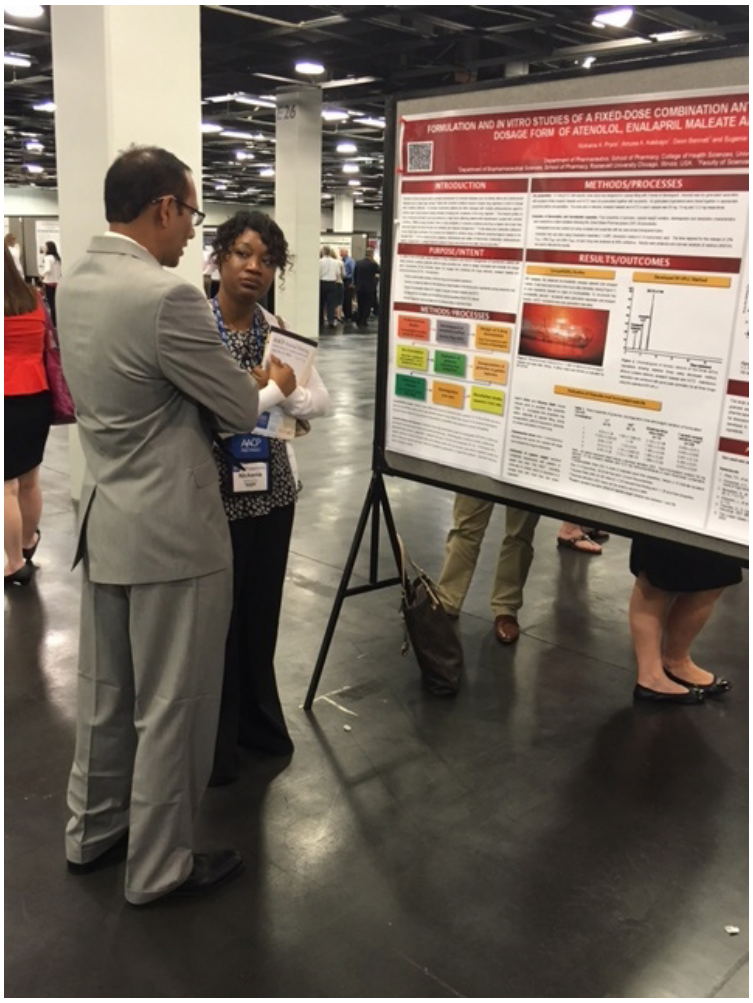
MASTER OF PHILOSOPHY (MPHIL) IN PHARMACEUTICS



The Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC7) recommends aggressive blood pressure (BP) control for morbidity and mortality reduction which usually requires at least two drugs to achieve BP goals. The 2014 evidence based guidelines as reported by the Eighth Joint National Committee (JNC8) indicated that attainment of BP goals (<140/90 mmHg general population or <140/90 mmHg for diabetes and chronic kidney disease) usually require use of multiple pharmacological classes of drugs. The increased number of pharmacological agents increases the complexity of drug regimen especially in the elderly with co-morbid conditions. Evidence from various studies indicated a negative impact of multi-drug regimen on patient compliance to medication therapy. On the other hand, fixed dose combination (FDC) therapies have been found to enhance drug compliance by decreasing the number of tablets to be taken each time.

“This study was designed to develop and evaluate the dosage form characteristics of an immediate release FDC form of atenolol (ATL), enalapril maleate (ENL) and hydrochlorothiazide (HCTZ), develop an analytical technique for simultaneous determination of the three drugs and assess the biopharmaceutical potential of the formulations.”

Differential Scanning Calorimetry (DSC) analysis of physical mixtures of drugs and drug-excipient combinations was used to assess compatibility. A 3-drug FDC in therapeutic range proportions for capsule filling with 5 levels of disintegrant. Capsule weight variation, disintegration and dissolution characteristics were measured as output variables following the USP 29 procedures. A reverse phase high-pressure liquid chromatography (RP-



HPLC) method was developed for simultaneous analysis of the three drugs. Compatibility studies revealed that the FDC could not be formulated as a tablet. Binary mixtures of ATL and ENL form a eutectic mixture at ratio composition of 40:60 (% w/w) ATL/ENL. Gelatin capsules were used instead. ATL and ENL were therefore separately dry-granulated and then mixed in appropriate proportions before encapsulation. Granule physical properties were satisfactory: compressibility index ranged from 8.53 ± 1.34 to 11.63 ± 4.23E-09, Hausner's ratio ranged from 1.09 ± to 0.16 to 1.132 ± 0.00+00 indicating good flow properties. Uniformity of capsules weight less than 15% RSD. Disintegration times for all formulations were found to be ≤ 2 minutes. Dissolution results were analyzed and one-way analysis of variance (ANOVA) was used to interpret the results. No statistical significance ($p > 0.05$) was found among formulations were found among formulations when percentage of drug released at T25%, T50%, T80% was compared (T25%= 1.25 min to 1.75 min, T50% = 2.25 min to 3.75 min, T80% = 4 min to 16.5 min). Formulation 5 containing 5% disintegration was the best as indicated by the granule characteristics and capsule disintegration and dissolution properties. Results generally indicated that an immediate release, fixed dose combination capsule if ATL and ENL are separately granulated before mixing with HCTZ for encapsulation. The HPLC method developed was precise (repeatability) and produced satisfactory separation for all three drugs. Once validated, this method could be applied for routine simultaneous analysis of the three drugs in single capsules. Capsule disintegration time was short and the dissolution rate was fast, indicating potential for high bioavailability of the drugs.

BUILT FOR LEARNING? A STUDY OF THE RELATIONSHIP BETWEEN THE CLASSROOM PHYSICAL ENVIRONMENT AND ACADEMIC PERFORMANCE OF SIX PRIMARY SCHOOLS IN TRINIDAD AND TOBAGO (2007-2014)

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“With an ever-increasing collection of research on the effects of the physical environmental on learning and Academic Performance, this study seeks to expand this area of research given that information is limited in the Caribbean and other Tropical Regions.”

The study therefore seeks to garner a better understanding of the effects of classroom physical environment on academic performance at the primary level. The analysis of six (6) Primary Schools in three (3) selected districts, using established criteria of lighting, acoustics, indoor air quality, temperature, wall colour, condition of furniture, seating configuration and building condition based on age was carried out to determine if they reflected a relationship with Academic Performance in the SEA examination over the past seven years (2007-2014). The measured criteria was also analyzed along with the qualitative data gathered from interviews and questionnaires held with education professionals and the School Principals. The relationships reflected that particular features such as temperature, noise and geographic location affected the performance of the schools assessed.

The study findings indicate that the classroom’s thermal and acoustic conditions need to be considered as the most salient components of design. Additionally, efforts have to be made on the input technology in the classrooms to create equitable learning conditions for all children.

KINGSTON OUT OF BALANCE: THE RENEWAL OF DOWNTOWN KINGSTON BY CREATING A LIVEABLE CITY

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MASTER OF ARCHITECTURE (M. ARCH.)

Can architecture respond to and solve social problems? If we live in a society defined by social imbalance, how can architecture and its ideologies ameliorate these issues?

> **“This study examines the use of architecture and planning principles to create a liveable Downtown Kingston, whilst overcoming perceptions and social barriers of ‘uptown’ and downtown’. The research focuses on applying the tenets of Jane Jacobs and other Urbanists to the existing landscape; and suggests that for the vital renewal of downtown Kingston there needs to be enough diversity in people, activities and opportunities.”**

The urban identity of Downtown Kingston is plagued by crime and violence and a social imbalance that continues to leave the city in a state of decline. It is argued that cities do not fail because there are poor people, but rather because there are not enough opportunities for a mixture of people to create a successful city. The approach to this is targeting the large transient population that works in Downtown Kingston so as to ascertain the views of the prospects for ‘new people’ to become a part of the residential population of the city. Vital to this method is the invested participation of the middle to upper income groups who work in the area but are largely underrepresented as a permanent demographic. It was found that there is interest in Downtown Kingston by these outside groups, from across the Kingston Metropolitan Area, however the extent to the understanding of urban living was not clear cut.

A CRITICAL ANALYSIS OF THE INDOOR THERMAL COMFORT IN MODERN DAY SINGLE FAMILY HOUSES IN TRINIDAD

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MASTER OF ARCHITECTURE (M. ARCH.)

Over the years, it has become apparent that thermal comfort in the tropics is of critical importance. When designing houses, understanding and respecting the outdoor climate is critical in creating comfortable indoor environments. This used to be the way houses were built in Trinidad, until there was a shift in how houses were designed and constructed. In the present day, there has been an outcry from residents of modern day single family houses that their indoor thermal environment isn't comfortable.

> **"It is clear that modern day single family houses do not provide a comfortable thermal environment for residents. The goal of this research is to analyze the thermal comfort of modern day single family houses to determine their comfort level for residence."**

The assessment of this research involved recording data from a sample of modern day single family houses located throughout Trinidad and valuating them against ASHRAE Standard 55-2004, older traditional single family houses and the perception of the residents themselves.

SILENCE TO LIGHT AND THE TROPICAL INTERPRETATION: INVESTIGATING THE PRINCIPLES OF LOUIS I. KAHN AND THE RELEVANCE IN JAMAICA WITH REFERENCE TO THE PHILLIPS EXETER LIBRARY

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Year Submitted:
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Degree:
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The Exeter Library by Louis Kahn (1965 – 71) is the subject of detailed and personal study, born of an admiration of the monumental and spiritual quality of Khan's oeuvre.

> **"Much of today's Jamaican architecture seems devoid of poetic intention, thoughtfulness, and respect for people and nature. As highlighted in an article – Jamaican architecture: The People's Views, visitors to the island, Architect Dr. Alberto Perez Gomez, and Ghanaian Architect Ralph Mills-Tetty explained that "A living building is one that houses life, and enhances the life of people."**

As such, poorly designed architecture - the very moment a space was conceived strong correlations with the religious deity, order and proportion, scale and symmetry were considerations never to be overlooked. This was the cases even for buildings which were not intended for formal worship. Modernity has eroded many of these considerations; however, Kahn was an exemplary architect precisely because of his philosophy and its application to functional – that is, in the realms of the aesthetic and spiritual. The study on Kahn has been quite challenging since he was seen as a mystic, loved but still misunderstood by many. His work is presented in this research as a relevant and appropriate precedent which can obviate the banality of contemporary spaces. In addition, the author has gained much insight in a personal way along the journey towards discovering his own unique architectural style as Kahn once journeyed himself.

This research is thus the springboard that will continue to enrich personal architectural manifesto that not only benefits the researcher but also sheds light in a tropical context and will encourage others along the path to creating more and more beautifully crafted spaces that continue to uplift the lives of a community and better yet, a nation.

AUTOMOBILES AND THE CITY: THE CHALLENGES OF INCREASED AUTOMOBILE USE AND ACCOMMODATION IN KINGSTON CITY, JAMAICA, OVER THE LAST SIXTY YEARS.

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2015

Degree:
MASTER OF ARCHITECTURE (M. ARCH.)

This thesis looks at the impact of automobiles on the formation and functioning of Kingston city. Automobiles, though very functional, have negative consequential impacts on the natural environment, the built environment, and human society, and so the purpose of this work is to evaluate to what extent the known issues exist in Kingston. This is done primarily through critical observation if selected spaces in the city, in order to inform a bigger picture of the city as a whole. Finally discussion and recommendations about how Kingston and its automobile accommodation could be improved is presented.

TOWN AND GOWN CRITIQUE: PAPINE, 2015: ANALYSING THE GROWTH AND POTENTIAL OF JAMAICA'S UNIVERSITY TOWN

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Year Submitted:
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Degree:
MASTER OF ARCHITECTURE (M. ARCH.)

Papine is a collection of communities that is located in the Eastern section of the parish of St. Andrew. It is bounded by the electoral constituency of Eastern St. Andrew and is represented by Member of Parliament, Andre Hylton. Papine is uniquely positioned at it is the gateway to the eastern rural area of St. Andrew and in between the most prestigious tertiary educational facilities in the island; University of Technology and University of West Indies Mona. With the location of the universities in proximity to Papine, the additional 20, 000 university student population that comes in daily, floods the business district of Papine creating a need for goods and services. This population, with its high and specific demands, creates a flourishing commercial environment for the locals and as such, Papine has seen exponential and unplanned development.

> **"The powers that be, Member of Parliament, local planning authorities and the Universities have been in dialogue in designating the area as a University District. In designating Papine as a University District, legislation and special financial opportunities must be tailored for the area in order to guide the growth of the area while fixing the existing problems due to lack of planning and enforcement of regulations. In creating the legislative tools to govern the development of the university district the area must undergo a comparative analysis to the benchmark of what defines a successful University District. This definition will showcase what are the main characteristics of a University District."**

With these characteristics tabulated, Papine can be compared side by side with the defining standards. This comparative analysis is to show where Papine ranks in as a University Town/ District. Understanding the short falls of Jamaica's premier University Town will greatly

inform the discussion on the potential of Papine: The University Town. The characteristics of the University Districts within the template are not all contextual with Jamaica let alone Kingston. These universities are much older, are much larger, have larger populations, are situated in better local and national economies and have better supporting infrastructure from the University and Towns to list a few differences. These variables are considered when comparing Papine to such esteemed places even when looking for comparisons. The socio-economic development of the Papine university town is heavily dependent on the natural and built environment that facilitates and sustains the inhabitants of the area. This goes for both university residents and non-university residents. The focus will then begin to narrow in on the built environment. The current state of the infrastructure of Papine needs to be dissected as to give a proper assessment of where Papine is now, so recommendations and actions can be made as to where Papine needs to head. The current state of infrastructure in Papine (residential, commercial and recreational) struggles to keep up with the large demand of goods and services required to facilitate the overall population. The growth of Papine has been exponential with time as locals and university population alike continue to grow in numbers. Investors attempt to capitalize on the demand by expanding but forgoing rules and guidelines set out by local authorities. Planning and construction that is purely profit driven lacking the consideration of quality of space results in a product that on a global stage is below subpar. The responsibility however is not on the local investors alone, but also on every stakeholder involved with the University District. The local authorities are responsibilities for the enforcement of current laws and restrictions to development of any area within the country. The University District of Papine has been seemingly ignored as infrastructure has evolved beyond what is allowed leading to the devolving of quality of space and ambience. The local authorities are also responsible for analyzing a place and amending laws and restrictions for development and construction, as is needed in the growing district of Papine. The universities should have a responsibility to their district as students and staff alike uses the facilities outside the fences of the institutions. As the universities wishes for more patronage with limited land, it is good practice to involve the environs in the development creating a beneficial relationship for both parties. Strengthening the relationship between the universities and the district is paramount to sustainable development between all entities.

SEXUAL PRACTICES AND PERCEPTIONS OF RISK AMONG UNDERGRADUATE STUDENTS

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Year Submitted:
2015

Degree:
DOCTOR OF PHILOSOPHY (PHD) IN CAREER AND TECHNICAL EDUCATION

“The main aim of this dissertation is to survey the sexual practices and perceptions of risk among undergraduate students attending a tertiary institution in Jamaica. The study was guided by six research questions.”

To answer these research questions, a cross-sectional survey research questions, a cross-sectional research design was used for the study. A total of 541 undergraduate students were selected using the stratified random sampling method. Data for the study were collected using the stratified random sampling method. Data for the study were collected through the use of a questionnaire and focus group discussion. Quantitative data were analyzed using descriptive and inferential statistics. Qualitative data were analyzed using thematic analysis. The results showed that three quarters (75%) of the students were sexually active with the male students initiating their sexual activities earlier than the female students. It was revealed that a few (1.9%) of the respondents had their first sexual encounter when they were less than five years old. The results of this study also showed degrees of differences towards the use of condoms among the respondents. More than half of the respondents (67.1%) used condoms during sexual activity and 52.6% stated that they have not changed risky behaviours despite concerns about Sexually Transmitted Infections (STIs). The Ministry of Health has instituted STIs campaigns and despite these campaigns the findings showed that only 32.7% of respondents reported not using condom during sexual intercourse.

The findings seem to suggest that there is still much to be done in terms of enlightenment campaigns, in view of the associated health hazards associated with risky sexual practices. According to the results obtained from this research, it can be said that a considerable number of the university students had sexual experience and those who are sexually active are at risk for important health

problems such as sexually transmitted infections and unintended pregnancies.

It is imperative that sexual practices be examined in the context of the perceived severity of STIs and the perceived susceptibility of individuals. Based on the findings and their implications, six recommendations were made such as early sexual debut has serious implications and the need for those in authority such as the Ministry of Health and the National Family Planning Board should be involved in campaigns that will target parents, schools and churches, to empower them with the tools to guide students in their sexual decision making. The university students' union should integrate sex education in their activities and the university educators should include safe sex practices during the orientation programs to increase awareness of risky sexual practices and behaviours among university students.

PREDICTING THE ACADEMIC PERFORMANCE OF STUDENTS IN CSEC INFORMATION TECHNOLOGY (IT) IN TWO JAMAICAN SCHOOLS

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MICHAEL E. NATION

Supervisor:
DR. SHERENE BOGLE

Year Submitted:
2015

Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

“The academic performance in Information Technology (IT) at the secondary level is an area that is involved in almost every discussion amongst educators and other stakeholders in Jamaica. Though Jamaican students are excelling in the regional rankings for the subject IT, however there has been a fluctuation in the performance rate over a number of years. As a result, this study sought to identify the factors impacting positive performance in the subject IT, thereby indicating the areas that are lacking in students who perform below the acceptable standard, specifically 60%.”

This is significant, as the researchers sought to identify the factors impacting IT performance which will allow stakeholders to improve collective performance and the country’s technological competitiveness through increased competency. Based on literature reviewed, the researchers utilized a conceptual framework known as the Social Cognitive Theory model which used constructs such as Self-Efficacy (SE), Outcome Expectation (OE) and Goal Setting (GS). The relationships between these constructs were used to examine and predict the academic performance of high school students pursuing the subject, IT. In the research design, the study used a quantitative approach in order to collect data from students at two reputable high schools in the parishes of Manchester and Clarendon. A convenience sample of 404 participants completed the survey instrument consisting of demographic characteristics and the selected SCT constructs. The reliability and validity of the survey instrument was tested using Cronbach Alpha and Factor Analysis. Correlation and Data Mining were used to carry out the data analysis, using SPSS and R. The findings suggest that SE was a dominant predictor which had a direct or indirect impact on academic performance. The contributions of GS and OE were found to be weak even though they had positively influenced the performance of students in the subject IT.

COMPUTER TECHNIQUE TO ENHANCE FUNCTIONAL ABILITY: A CASE STUDY DIRECTED AT LOWER EXTREMITY IN PERSONS IN THE POST-ACUTE PHASE OF STROKE

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Supervisor:
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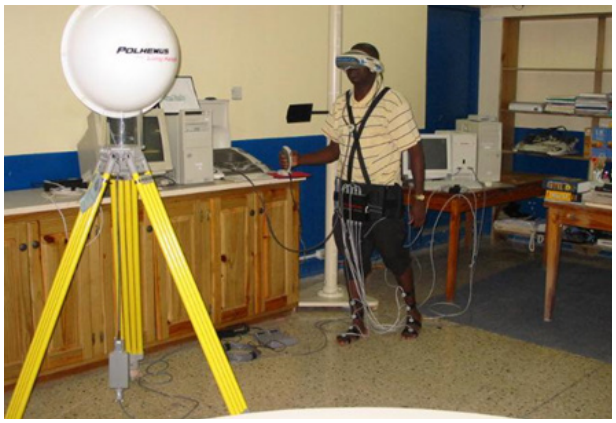
Year Submitted:
2015

Degree:
MASTER OF PHILOSOPHY (MPHIL) IN COMPUTER SCIENCE

This research work investigated a case study of a computer-based exercise system in order to ascertain the effectiveness of this alternative technique in enhancing the functional ability of lower extremity controls in persons in the post-acute phase of stroke. The study employed the earlier notion that intensive massed and repetitive practice can lead to improved motor function, especially when augmented with technology.



“A research subject with an evidence of a stroke assault who had been diagnosed as having attained the maximum level of improvement in walking skill was trained using a computer-based exercise system for two weeks. Prior to, and after the administration of the computer-based intervention technique, gait technique that focused on cycle time, stride length, and inversion and eversion was carried out to ascertain if there had been improvement abnormalities to further buttress the efficacy of this alternative intervention technique. The computer-based exercise system provides therapy by having the subject out a painting exercise at different levels of difficulty while immersed in a virtual environment.”

In order to improve the effectiveness of the exercise system, the computer program was modified to vary the size of the paintbrush tip presented to the subject at different difficulty levels. The size of the paintbrush tip was reduced with each level of difficulty. When traditional rehabilitation is administered to an individual after the occurrence of stroke, therapy ceases when improvement can no longer be measured. Therapists refer to this maximum level of recovery as plateau. The tests that therapists use to determine the point of plateau are not sensitive enough to detect small but important changes in recovery thereafter. The gait analysis applied in this research demonstrated the improvement in the research subject's gait past the point of plateau as effected by the administration of the computer-based rehabilitation technique. The research work showed a 4.84% improvement in the subject's cycle time deficiency, a 10.9% improvement in the subject's stride length deficiency and an 85 improvement in the subject's eversion deficiency among other gait variables as detailed in the analysis and results. The completion of the project helped to confirm the usefulness of computer-based therapeutic intervention in enhancing the functional ability in persons in the post-acute phase of stroke.

COLLABORATIVE TECHNOLOGY USAGE AMONG EDUCATORS: AN INVESTIGATION OF FACTORS AFFECTING THE ADOPTION OF WEB 2.0 TECHNOLOGIES

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Technology adoption continues to be in the mainstream of research, due to the wide range of technologies examined, their applicability and the fast rate at which users are applying them to various situations.

> **“The use of Web 2.0 technology has been increasing because they offer new levels of interaction which improves collaboration and information sharing. Although these tools add value to the educational process and provide greater levels of interaction, there is a low level of adoption by educators within the classroom.”**

As a result, this research seeks to identify what factors impact educators' intention to use Web 2.0 technologies to support their teaching in the classroom, using constructs identified by the Unified Theory of Acceptance and Use of Technology (UTAUT) Model. The research team applied the Unified Theory of Acceptance and Use of Technology (UTAUT) model which looks at the constructs, Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions, which was modified to also examine the construct self-efficacy and the relationship with Behavioural Intention. A quantitative research design was used to collect data from educators, in total (n=98) survey instruments were used in the analysis. Partial Least Square (PLS) Path Modelling was used to carry out Measurement and Structural model analysis. The results indicate that Effort Expectancy, Performance Expectancy, Social influence and Self Efficacy are predictors of intention to use Web 2.0 technologies within the classroom.

The research has contributed to the body of existing literature by confirming the contribution of the constructs of the UTAUT model to the behavioural intention of educators towards using Web 2.0 technologies in the classroom. The research is also significant as it can be used to inform the development of policies, strategies and interventions to assist in the smooth transition to using technology within the classroom.

TOWARDS BALLISTIC FORENSIC INVESTIGATIONS USING NOSQL GRAPH MINING DATABASES

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2015

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MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

Forensic evidence plays a very important role in supporting investigations and the criminal prosecution of perpetrators of crimes within our court systems. This is particularly relevant in countries like Jamaica where witnesses often refuse to come forward and provide information, due to fear of being targeted by criminals.

“This thesis provides an important proof of concept study for collecting and interrogating digital forensic data used in informing physical crime scene data investigations. The work is grounded in the well-established forensic model frameworks for digital investigation. The experimental analysis provided in this study uses the statistical programming language called R to simulate and interpret the results collected against a NoSQL (not only SQL) graph database called Neo4J.”

Graph mining techniques are then applied to determine the levels of precision and accuracy against the compiled ballistic data sets, i.e. firearm data, and associated gang-like activities related to such firearms. The findings of this study are intended to demonstrate that law enforcement can make plausible hypothesis that could be used to draw reasonable inferences about firearm crime. This work is the first of its kind, in the current literature available, with respect to intelligent ballistic data tracking for forensic crime scenes within the Caribbean region. This work patches the gap in the literature with respect to the conduct of scientific analyses and the creation of hypothesis that gives greater certainty value to the assessment of target evidence compiled within ballistic digital investigation processes. This approach benefits from the certainty value calculations, based on using graph mining algorithms, which allows one to cluster and filter gang activity based on the geo-location of firearms. The geo-location of firearms is described as nodes in a graph and hence the assumptions of graph theory as an application in this work. The work sought to answer two (2) research questions (i) What is a framework for collecting and evaluating forensic data for identifying interesting patterns in criminal enterprises (ii) how should the ballistic datasets be collected within a NoSQL graph, using the proposed framework? (iii) How does one evaluate the

forensic significance of the data collected from these No SQL utilities? The researcher used NoSQL graphs instead of traditional relational database management systems, considering that the size of the ballistic data is now at well-established big data proportions (in our case petabyte scales). The NoSQL graph databases allow for large unstructured data sets (i.e. heterogeneous data types) which allows modeling for a variety of record-sets relating to firearms, gangs and their locations as the aggregate data types. This in essence allows for the NoSQL database to be visualized as basic social networks of forensic activity for which law enforcement can make its assessment. These forensic assessments include a three tier approach of (i) tamper proof forensic ballistic data collection followed by (ii) statistical analyses of the collected data and then (iii) An interpretive analyses of the collected data and then (iii) An interpretive analyses of the sieved data collected from (ii).The experimentation revealed that the ballistic data collected by exporting data from local suspect forensic database systems to the centralized NoSQL Neo4j graph database acts as a tamper-proof and digitally secure transformational staging target area (i.e. data warehouse) for data collected from our suspect Access, Revise, Evaluate and Analytics for Gun Activity Patterns (AREA GAPS) system which serves as the online relational transactional process (OLTP) ballistic database store. By tamper proof one means that the referential integrity of the ballistic data moved from between the suspect source and our evidence target database is preserved. By secure one means that the anonymity of the data sets are preserved by suitable levels of access control o the ballistic data as well as robust and provably strong encryption procedures. As the author of the thesis with the remit of responsibilities within the ballistic unit of the police force in charge of this particular project, these observations are well understood. For the purposes of this thesis work we de-emphasize the need for discussing any issues of access control or encryption protocols used as this requires an independent study. The snapshots of data and meta-data moved between the AREA GAPS system and our Neo4J database is handled by the well-established computer triage process. This tamper proof triage process allows us to ably respond to question one in this thesis study. To answer the second question in this thesis study question one had to be satisfactorily achieved. With respect of answering question two 2), the R statistical programming language was used to analyse and identify patterns form which to make potential inferences with respect of firearm activities associated to gangs in given geo-locations. The experimental results of the study that supported the responses to question two (2) show that clustering nodes based on density of their connections, provide useful potential evidence by way of garnering useful information about a firearm and it's attribution to a given gang based on the given geo-location. Hence inferences based on the attribution given the featured selection set on firearms, it's location, and gang associations were treated as the three mutually dependent variables linked to our graph node theory. The details of how this clustering algorithm analysis was done is detailed in chapter 4 of this thesis work. Tied to the results obtained from question two (2) we compared the clustering mechanisms to well-known graph pattern matching as the approach to qualify the inferences in results.

TRIBOLOGICAL BEHAVIOUR AND MECHANICAL PROPERTIES OF POLYMER/ALUMINA COMPOSITES

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Year Submitted:
2015

Degree:
MASTER OF SCIENCE (M.SC.) IN CHEMICAL ENGINEERING

The continuing quest to develop new materials and improve on existing materials is the main thrust in materials research.

“In this study, expoxies (diglycidyl ether bisphenol-A) and West System 105 epoxy resin) and alumina (A12O3) were formed into composites and the tribological and mechanical properties were investigated. The aim was to gain an in-depth understanding of the sliding wear behavior of polymer-alumina composites under dry and lubricated conditions.”

A block-on-ring wear test was performed with the polymer-composite as the block and tool steel disc as the ring. In order to fully understand the study, the impact, hardness and water absorption factor of each specimen were also determined, and images of the worn surface of the poylmer-alumina composite were analyzed. The optimized specimens that were established are Specimen A (25.45), Specimen B (25/75), and Specimen C (15/45). The results of tests on these specimens indicated that polymer-alumina composite can replace existing materials in certain applications.

INTEGRATED MANAGEMENT INFORMATION SYSTEMS SOLUTIONS FOR EDUCATION INSTITUTIONS

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Education today is under pressure of the dynamic marketplace, where profound changes in competition have made the institutions to think education as a business. Having regard to state of the market, each educational institution have to use an Integrated Management Information System (IMIS), which focuses on assessing the current behavior of the institution in respect to its efficiency, effectiveness, its future goods and objectives. Nowadays, every educational institution is not just focused on classroom activities, but also involves various aspects of operations like strategic and operational planning, business model and procedures, human resources management, teaching and learning, student's evaluation processes, students' services, academic staff, and subjects/modules evaluation by students, peer, supervisor evaluation, etc. Generally, these different kinds of institution's activities can be classified into four main management processes – Customer service, Internal Business, Learning and Growth, and Financial Processes. These perspectives cover common operating aspects of the institution, contribute to linking long-term strategic objectives (Strategic planning) with short-term actions (Operational planning) and, therefore, exhibits not only the current position of the institution but also how it is progressing.

> **"The current study proposes integrated management solutions within IMIS for the educational institutions, which provides: An effective and transparent operational/ strategic planning framework at all levels, including individuals by linking objectives, initiatives and measures to one holistic institution's strategy; Focus on quantitative measurable outputs and deep analysis of management processes and recommendations for improvement; A verifiability (control and analysis of management processes in the institution)."**

The results of current study related to and make contributions in areas of: IMIS management – for executive managers of the institution, including those, who are responsible for development, implementation, and maintenance of such systems; Theory of Management; and Computer Science (Information Systems).

IMPROVING THE LIFE CYCLE MANAGEMENT OF POWER TRANSFORMERS

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Jamaica Public Service Company Limited (JPS) has the largest transformer fleet in Jamaica with one hundred and eleven units at their substations. JPS' unaudited data showed fifteen power transformers failing from 2004 to 2013. Three were in-service failures and were deemed to have resulted from internal faults. JPS power transformer maintenance program included conducting routine electrical field tests on the units as well as collecting and testing oil samples. These results were manually analyzed by the maintenance engineers. Challenges such as reduced staff, misplaced data, and human errors during analysis hampered the maintenance program's effectiveness. This analysis method was time consuming, reports had errors, re-test dates were missed, and corrective actions delayed.

"This research proposed a reduction in power transformer failures through the development of a custom-built Power Transformer Maintenance Software (PMTS) that effectively analyzes both oil and electrical field tests results in accordance with international standards and utility's best practices. Trending test results, analyzing loading data, storing maintenance and failure records, and computing health index and data quality reports for individual power transformers were features of the prototype PTMS that was developed for individual power transformers were features of the prototype using a Microsoft Excel platform."

Power transformer health is reflected in the state of its insulation. Several tests are conducted to determine the insulation strength. The effect of aging, contamination and heat stresses the insulation and overtime leads to its breakdown. If unnoticed, this will inevitably result in the catastrophic failure of the transformer. PTMS analyzes the major diagnostic tests conducted on power transformers and computes the transformer's health index as well as produce concise trending reports for each test. Existing power transformer software such

as Transformer Oil Analysis and Notification System (TOAN) analyze and manage oil tests results mostly focusing on the dissolved gas analysis (DGA) and moisture content. Other software such as Doble Test Assist Software (DTA6) analyze and store sets of electrical field tests results but do not facilitate trending. However, PTMS stores, analyzes, and trends both sets of test results. The black-box software testing method was used to validate the accuracy of the data analyzing modules in PTMS. Additionally, the software was critiqued by JPS engineers/technicians whose feedback iterated benefits that PTMS would bring to improving the life cycle management of power transformers through its comprehensive data analysis and informative transformer health summary reports. The trending feature of PTMS is geared towards predictive maintenance. PTMS may also be used by power transformer manufacturers as a suite for presenting factory test results. Its structure allows for other diagnostic tests to be included by incorporating new modules. There is also the possibility of transferring PTMS to an online engine with internet interface to constantly monitor the power transformer health and allow for information to be accessed from anywhere and at any time.

ASSESSMENT OF THE CURRENT PRACTICES INVOLVING THE USE OF RE-FORMULATED ADULT DRUG PRODUCTS IN THE MANAGEMENT OF CHILDREN WITH HEART DISEASE AT A MAJOR PAEDIATRIC HOSPITAL IN JAMAICA

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A cross-sectional survey of prescriptions processed (January and December, 2010) at the Bustamante Hospital for Children (BHC) was undertaken to document drugs prescribed and used in an unlicensed manner/compounded with focus on cardiovascular drugs used to manage heart failure.

A total of 3747 (10.42%, n=35,971) prescriptions containing over 10, 9797 prescribed items were surveyed. Age inappropriate solid dosage forms (tablets and capsules) accounted for approximately 6.83% (737) of total prescription items while cardiovascular specific drugs accounted for about 5.24% (565). Overall 5,227 items were manipulated via powder/granule reconstitution (32.75%), tablet splitting (0.54%), tablet crushing (39.30%), capsule emptying (0.36%) and other forms compounding (24.15%). Stability studies (physical, chemical, and microbial) of captoril 3mg/5 mL and furosemide 4 mg/5 mL compounded liquids were done. These two drugs had an estimated 80.26% and 87.94% of prescribed doses manipulated and were among the top five prescribed at the institution. Stability studies aimed to evaluate the impact of modification on the quality and shelf life stability of compounded liquids (captopril 3 mg/5mL and furosemide 4 mg/5mL). Stability studies were conducted at 5, 25 and 35oC for captopril and 5 and 25oC for furosemide. Drug content, pH, microbial limit test (total aerobic count, fungi and Escherichia coli) were monitored over 28 days with testing done at 7 day intervals. Stability-indicating high performance liquid chromatography method was used to assay drug content. Two-way ANOVA and post-hoc Turkey's HSD tests with a priori level of significance set at <0.05 was used for data analysis. Baseline assay of the compounded medicines indicate drug content generally within BP specified limit (Captopril 109.78% ± 0.97; Furosemide 102.9 ± 1.16). Captopril showed temperature-dependent first-order degradation kinetics with rate constants (k) of 0.002, 0.012 and 0.019 day -1 for samples stored at 5, 25, and 35oC (r2= 0.9583, 0.9614, and 0.9899; p <0.05). Degradation at day 28 were 5.47, 29.28 and 41.64% for samples stored at 5, 25, and 35oC (p <0.05). Microbial growth (2.8x 103 to 3.2 x 106 cfu/mL) in samples stored at 25oC exceeded acceptable limits. Furosemide showed a zero-order degradation kinetics with ko 0.0077 and 0.007 mg.5mL-1 (p>0.05). Microbial growth (2.9 x 107 cfu/mL seen in samples stored at 25oC exceeded the microbial limits. Degradation at day 28 was 5.87% and 5.62% for samples stored at 5 and 25oC. In conclusion, the unlicensed use of drugs

to manage children is still a relevant practice. Captopril and fursemide were among those commonly prepared at the institution. Both model forms were stable when stored at 5-8oC with the beyond use date of 14 days appropriate.

> **"There is concern, however, regarding the stability of the preparations if the storage conditions are not adhered to. Also, care must be exercised when size reducing tablets of insoluble drugs as dosing errors may occur. The implementation of quality assurance programs is vital for the provision of safety, stable and efficacious products and cannot be over-emphasized."**

DISASTER MITIGATION HOUSING: DOCUMENTING RECENT POST-DISASTER HOUSING AND RESETTLEMENT IN JAMAICA (RECOURSE IN JAMAICA)

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“This research investigates different categories and construction methods of disaster relief shelters. It also aims to provide recommendations as to recommendations as to emergency deployable shelters (tent-like structures), suitable for Jamaica’s economy, terrain and disasters specific to our region. The study depicts an abridged history of the Natural Disasters that affected Jamaica, and the severity of their impacts.”

It outlines the era of industrialization, when a shift in construction methods and techniques took place and value it had on the nation’s population and future development. This historical benchmark provided vital information that was used to appraise three (3) cases of dissimilar housing approaches. Thereafter, five (5) types of on-site deployable emergency shelter solutions were recommended on the basis of suitability. The inclusion of a disaster management plan, of which emergency shelters are implemented, would revolve solely around Jamaica’s economy. The current state of economy (2014 – 2015) comprises of an insufficient National Disaster (NDF) which is 0.6% of the funding required for the country to adequately handle a crucial disaster. This critically steers the decision making process, in terms of what methods and sacrifices need to be made by the local government in providing housing to disaster victims. This state of the country’s economy, along with documenting and analyzing local and international cases of relief housing, was used as the basis in recommending the most suitable and sustainable materials and technologies for construction. These materials technology and shelter recommendations are chosen based on their availability locally, longevity and costs. The research includes a composition of both qualitative and quantitative approaches (further explained in the research methodologies). These strategies are paired with interviews, site visits and analysis. The intention is not to create a document which should be ‘strictly’ adhered to. Rather, it seeks to establish a benchmark on which to further build upon in the exploration of ideas, associated with developing successful disaster mitigation plans.

EXTRACTION, CHARACTERIZATION AND STABILITY KINETICS OF ANNATO COLOURING FRACTIONS WITH POTENTIALS FOR APPLICATION AS PHARMACEUTICAL COLOURANT

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The seeds of Bixa orellana (Annatto, family Bixaceae) have been used in food colouring for over 50 years. With the aim of introducing its extracts as pharmaceutical colourant, there is the need to investigate the stability (light, temperature and pH), the biological and pharmacological activities of the extract.

This study was designed to develop extraction protocols for annatto colouring fraction with potential for pharmaceutical application, evaluate its stability, and evaluate the physiological activities (specifically antimicrobial and antioxidant effects).

Powdered seed material was extracted using acid-base protocols and the crystal obtained were washed with deionized water, oven-dried for about 12 hours at 45oC and stored in airtight containers. The annatto seed extract was subjected to instrumental analysis. Infrared spectroscopy was used to confirm sample composition. The annatto seed extract was screened for phytochemicals, the result revealed the extract contain some bioactive constituent saponins, tannins, terpenoids, steroid, glycoside, carbohydrate, and flavonoids. The stability studies revealed that the annatto extract is thermo and photosensitive as it degrades faster at high temperature and on exposure to ultraviolet light. Photo- and thermo degradation follow the first order (concentration-dependent) kinetics. The pH study revealed that annatto seed extract degrades faster in acidic conditions.

“The antimicrobial activity of annatto seed extract was tested on Gram positive and Gram negative bacteria using Ampicillin and streptomycin as positive standard. The annatto seed extract produced antimicrobial activity against the Gram positive bacteria (Staphylococcus aureus and Bacillus subtilis).”

The in vitro antioxidant activity was tested via 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity and iron (III) chloride reducing power using ascorbic acid (vitamin C) as a reference standard. The free radical scavenging activity of annatto seed extract ranged from 5.5% to 48.9% relative to ascorbic acid (2.9% to 41.5%) at respective concentrations between 0.25 and 2.5µg/ml. Similarly, iron (III) chloride reducing power shows good linear concentration-dependent relation (R2=0.9934). Results generally indicated that annatto seed extract is a potential source of antioxidants of natural origin.

URBAN TATTOOS: INSTRUMENTS TO READ THE CITY - INVESTIGATING THE USE OF STREET ART IN RE-APPROPRIATED URBAN SPACES, WITHIN RADII OF MAJOR ARTERIES IN THE KINGSTON METROPOLITAN AREA, AS INSTRUMENTS OF NARRATIVE IN NAVIGATING THE CITY.

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"This research focuses on how street art in urban spaces, within radii of major arteries in the Kingston Metropolitan Area (KMA), impacts the navigation and perception of the city. The objective is to determine the viability of street art on urban objects, particularly examined the impact of the temporal nature of street art on urban orientation."

Individual and group meanings assigned to urban surfaces, edges, and places, are just as subjective as the memories that influenced the arrival at those particular meanings. Therefore this study was developed around thematic patterns generated by the proliferation and varying degrees of visibility of street art. The themes deduced were reading, residue and repetition. It was found that the cycles of renewal and serial imagery that propelled these themes, substantially added to the general livability of the city by means of way finding. However, the data revealed that it is unnatural for persons to construct relationships between street art, objects of the built environment, and circulation passages, to form mental maps of the city. Nevertheless, street art was proven to be used as navigational aids in the KMA, regardless of how familiar the location was, the size, theme, or canvas of the art.

As the only study of its kind on the KMA to date, the ultimate intention is to unearth latent patterns between street art and the site-specific contexts it mediates and emerges from to objectively evaluate impressions on the legibility of the KMA.

PACKAGING PARADISE: TOURISM ENCLAVES AND THE SHIFTING SPACES OF JAMAICA'S COASTAL TOWNS WITH REFERENCE TO FALMOUTH, TRELAWNY

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The effects of globalization are far reaching and developing nations – now placed in the same arena as large western powers, feel an ever-increasing pressure to meet the standards for development as laid out by developed countries. The tourism industry has become the basis upon which many Caribbean nations are seeking to achieve economic prosperity and developed nation status. The tourism industry– in particular within the postcolonial West Indian context, is built upon the (presumed) needs and desires of a transient collective – tourists, originating primarily from first world nations.

> **"This paper seeks to examine the ways in which, and the extent to which, transient populations, in particular tourists, (inadvertently) alter the urban fabric and spatiality of the locales they visit. Tourism development– which is geared at satisfying the tourist, results in spatial changes driven by the fleeting needs of transient collective, as opposed development that satisfies the more complex and layered (in some ways mundane) needs of a local, and relatively static population."**

That is not to say that the needs and desires of tourists are not complex and varied, however, the approach taken with respect to the development and packaging of the Caribbean region as tourism product does not reflect such complexity. It is an approach that presupposes that the tourist collective is seeking a hedonistic adventure of sorts. It may be true that they are in fact seeking a 'reality' of this nature, one, which however, no longer exists, or in many cases or in many cases never existed to begin with. The tourism product which is created to satisfy these presuppositions is just that, a manufactured reality – made physical in some cases, which has its origins in the imaginations of colonial advertisers who looked to encourage North American and European tourists and investors to partake in the Jamaican (Caribbean) experience of paradise in the late 19th and early 20th century. Of particular interest is the disparity created by the existence of amenity rich enclaves situated in the midst of rural coastal areas, which, in many cases lack the adequate physical and

social infrastructure to support the development of local populations. The notion that the Caribbean, and in particular Jamaica, has qualities attributable to a paradise is not being disputed. It is however, important to consider the implications of development– a term evocative of growth and transformation, which is hinged on archaic and misplaced notions of paradise and on colonial archetypes and norms.

BELIZE CITY AND CLIMATE CHANGE: BELIZE CLIMATE CHANGE STRATEGIES

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The study focuses primarily on Belize City, the commercial epicenter of Belize as it contends with the hazardous implications of a changing global climate. I intend to examine Belize City's susceptibilities to Climate Change and the strategies formulated to mitigate them.

> **"The research focuses on the various policies governing Climate Change mitigation, Belize City's urban development and, the significance of changing climate conditions on the practice of architecture in Belize City. The study includes an investigation of Singapore's urban development strategies to highlight the social, economic and environmental benefits of integrating ecological resources into development plans."**

The findings show that Belize City's prospect of Climate Change resilience lies in the prioritization of sustainable development and the symbiotic coexistence with its natural resources through the inclusion of environmental synergies and risk reducing strategies in architecture, urban development and legislature.

AN ASSESSMENT OF THE IMPACT OF USER-ADAPTATIONS OF A PREFABRICATED HOUSING SOLUTION ON THE ARCHISCAPE IN JAMAICA

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“This research examines housing problem, a prefabricated solution, and the impact of the user-adaptations of this solution on the archiscape in Angels Grove, St. Catherine, Jamaica”

The challenges facing governments to house the working poor in both developing and developed countries are widespread. Some governments have tackled this perennial problem through strategies and policies in order to find the appropriate solution. One solution used in Jamaica is a prefabricated building system. This homogenous system has prompted individual user-response through the act of place-making in order to produce architectural expressions that changed the archiscape.

USING PRAXIS TO INFORM THE DEVELOPMENT OF A MODEL FOR INTEGRATING TECHNICAL VOCATIONAL EDUCATION AND TRAINING INTO JAMAICA'S FORMAL EDUCATION SYSTEM TO ENHANCE NATIONAL PRODUCTIVITY

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The development of Technical Vocational Education and Training (TVET) over the years has been very slow in Jamaica, although there is evidence that some improvement has taken place recently in the education system generally, and the country is now on the cusp of further advancement. Little appears to have been noticed about the role TVET has been playing and its potential to significantly impact national productivity. This has been linked partially to a disconnect of the TVET programme from the general education system.

> **"The purpose of this study was to trace and document the historical development of TVET within the education system of Jamaica with special attention to the past, present and future of TVET, and its contribution to national productivity. The training and experience garnered by the researchers in TVET is also documented. The study further sought to develop a mechanism by which TVET could be streamlined and integrated into Jamaica's formal education system."**

A Reflective Topical Autobiography (RTA) approach was used to document the researcher's journey in and contribution to the development of TVET over the years. This RTA approach, together with documentation with documentation and critical analysis of the various transformational stages that the TVET development in Jamaica has passed through, informed the conceptualization of a model needed to enhance and securely integrate TVET within the Jamaican education system as a key tool for improving national productivity. This model is currently being recommended for adoption by the Ministry of Education as guide for the integration of TVET within the education system.

It is also being recommended as the basis for the infusion of TVET in the development of the new grades one to nine curricula currently taking place in the Ministry of Education. Other recommendations are also made herein that will form the basis for repositioning, and therefore ultimately reaping the benefits, of an integrated TVET system in a country that needs re-focusing to realize urgently needed improvement in its socio-economic situation.

A BIG DATA EVALUATION SERVICE LEVEL AGREEMENT MODEL FOR THE PRIVATE CLOUD COMPUTING ENVIRONMENT

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MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

“With the growing demand on movement of data in larger volumes, particularly data sets in the order of a terabyte and greater (popularly described as big data), that no longer hold within the structured relational databases has become a significant challenge.”

The recognition that these volumes grow quickly, within private and public organizations, assumes the need to support timely access mechanisms to ensure suitable service levels to its clients. Timely access to this big data, in the event of a system failure seriously compromises the organizations ability to continuously provide data services to its end users. The problem becomes important when one considers that the data in itself is mission critical to the needs of the organization. The problem is then amplified when the data is placed within virtualized data cloud computing environments. It is well understood within the literature that these data cloud services are predicated on the use of services oriented architecture (SOA) frameworks.

In this thesis one explores the use of suitable big data migration models and evacuation models to scientifically examine optimal time results for the transactional movement of such data volumes, within mission critical end user environments like those of authors in this thesis work. More specifically the contribution of this thesis work measures the rate of transactional rate of transactional flow of big data volumes within the data centre organization.

This transactional flow rate between the operational store and the backup environments and vice versa helps to determine suitable service level metrics for the organization having to handle these emergent data trends. We describe this as our “big data evacuation model”.

TECHNOLOGICAL RISK MANAGEMENT FRAMEWORK FOR SMALL TO MEDIUM ENTERPRISES' E-SCM IN JAMAICA

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Degree:
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Technology disruption is an issue of great importance to Small to Medium Enterprises (SMEs) who have to manage their supply chains' physical and web-based infrastructures. This document seeks to highlight those issues that will be faced by these SMEs when there are disruptions in Internet service and to detail what aspects of the e-SCM will be affected by this loss in service. It was discovered that though some organizations may have a risk management plan, it is not adequately enforced and knowledge with respect to IT disruption lies solely within the IT department.

"A Technological Risk Management Framework (TRMF) was developed based on the assessment of two existing frameworks and four core components as it relates to supply chain resiliency (partnerships, policy, strategic and information technology). The TRMF is to be a guide in addressing the issue of Internet disruption, facilitate e-SCM resilience and encourage the involvement of Executive Management in the process to ensure its integration in the organization's policies and procedures."

A qualitative approach along with the design science methodology was used to conduct this study to gather data and evaluate the usefulness of the framework. Risk management with respect to technology is not a widely researched topic, but where it does exist, it is mainly in the fields of Software Engineering and Financial Information Systems. With technology becoming a significant driving force across various fields and industries that rely heavily on information systems, more research is needed in this area with respect to risk management.

SENTIMENT ANALYSIS OF CONSUMERS' PERCEPTIONS ON SOCIAL MEDIA ABOUT THE MAIN MOBILE PROVIDERS IN JAMAICA

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In recent years, organizations have become increasingly interested in the possibility of analyzing social media as a means of gaining meaningful feedback about their products and services. Some scholars believe that the analysis of social media gives organizations a fast and effective way of monitoring the public's feelings toward their brand.

"This study introduces the use of sentiment analysis tools and technique to determine how consumers feel about the main mobile companies in Jamaica. The outcome of the study is to inform these companies' marketing strategies so they can improve, maintain or change their product or service lines to meet consumer needs and ultimately increase their profits while reducing costs. The supervised machine learning approach is applied to predict sentiments of Twitter tweets on Digicel and Lime Jamaica. These are analysed using the aspect-based sentiment analysis technique."

The results indicate an average of 82.2 percent accuracy in classifying tweets when comparing three separate classification algorithms against the purported baseline of 70 percent accuracy. This result indicate that the analysis of sentiment on social media in order to gain customer feedback can be a viable solution for companies looking to improve their business performances while achieving respectable savings.

SOCIAL MEDIA IN LAW ENFORCEMENT: AN INVESTIGATION INTO ITS USE AND PROSPECTIVE ROLE AS A STRATEGIC ICT APPLICATION IN THE FIGHT AGAINST CRIME

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With the growing popularity of social media, the police have started taking a keen interest in leveraging its capabilities to improve various aspects of their operations.

> **“The use of social media in law enforcement is very new as such there is little consensus among law enforcement agencies with regards to a common approach to developing and employing social media practices in their law enforcement programs. While previous studies have focused on the steps to implementing a social media in government organizations, very little research has been done to establish frameworks which can be used to develop strategic focus for the use of social media for law enforcement.”**

A qualitative methodology was employed to investigate and document various approaches and concepts involved in the use of social media for law enforcement. A descriptive framework for categorizing key factors in social media use among law enforcement and actions for success are proposed. The framework was used to evaluate aspects of the JCF social media policy and compared to the actual usage of the social media tools in their daily operations.

DATA SECURITY RISK MANAGEMENT FRAMEWORK: BUILDING RESILIENCE INTO A GOVERNMENT PORT COMMUNITY SYSTEM FOR THE GLOBAL LOGISTICS HUB IN JAMAICA

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Year Submitted:
2014

Degree:
MASTER OF SCIENCE (M.SC.) IN INFORMATION SYSTEMS MANAGEMENT

Data-security risk management is becoming an increasingly important process in modern day logistics due to globalization and competition.

> **"The purpose of this study is to examine the potential data security risks associated with the Port Community System for the proposed Global Logistic Hub in Jamaica, to determine the impact these risks will have on hub operation and to develop mitigating strategies to deal with these risks should they occur. It is especially important to be assessing the risk impact at this time because there is a dearth of study that speaks to risk impact and assessment as it relates to Logistics Hub investment. The results of the risk impact analysis/impact can then become a guiding tool to support an informed decision for this multibillion dollar macro investment."**

The framework is based on the principles of ISO 31000 and Project Risk Management standards to provide a holistic guide in data security risk management to facilitate the efficient management of critical information systems data from risks and catastrophe. The framework can be used to guide management of the Port community System (PCS) in reducing the losses resulting from the realization of risks to its data. This paper presents a qualitative research on data-security risk management framework based on ISO 31000. The designed architecture includes four components, they are risk identification, risk analysis, risk responses and monitor and control risks. The method used to examine the framework was conducted based on expert judgment in the field of Information System for an average of 10 years. Therefore, different data security risks are determined and mitigated strategies are implemented in a data security risk management register that will support a resilient Port Security System.

The study suggests that while there are some security features that will be implemented in the Port Community System to support resilience, there is no formal data security risk management framework. The significance of the findings would suggest that there is need for formal data security risk management framework for the Port Security System.

TOWARDS A SOCIAL MEDIA GOVERNANCE FRAMEWORK BY USING THE EVALUATION OF USER BEHAVIOUR PATTERNS TO INFER ELEMENTS OF SOCIAL MEDIA USER ACTIONS TO AID IN THE MANAGEMENT OF SOCIAL MEDIA NETWORKS WITHIN ORGANIZATIONS

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Evaluation and prediction of human behavior has been studied for years by scientist from varying backgrounds. In the past the lack of large volumes of data about an individual's pattern of action presented a challenge. The emergence of social media networks provides an opportunity to use the high volume of personal data that is present in these environments to study behavior patterns based on user actions (liking, sharing or commenting on a post etc.).

> **"This thesis looked at inferring elements of user actions within the social media networks Facebook and LinkedIn by applying the Bayesian classification approach combined with user behavioural modeling to determine patterns of social media user activity based on the profiles of the users. In addition the social media plug-n-play tool TweetPsych was used to generate and evaluate the profiles of two Twitter users' activities."**

Understanding an individual's social media behavioural profile is not the only important from an academic standpoint but also serves many uses within the business. The assumption is that social media can act as a potential source for providing market intelligence, as well as assist with law enforcement activities in a digital investigation. Organizations accordingly can use social media profiles in tracking human activity as an enabler for governing the organization. The results of this study show that it is possible to infer human behavioural patterns based on social media action i.e. likes, posts shared, etc. This can aid with the management of social media within organizations.

The results of the study were applied within the context of the Information Communication Technology (ICT) Security Governance Framework (based on ISO/IEC 38500 standard).

The results interpretatively represents a straw man approach for organizations in general who seek to move towards an adoption of social media security governance as an emergent trend in managing the organization.

NUMERICAL ANALYSIS OF A MULTI-BED ACTIVATED CARBON/METHANOL ADSORPTION REFRIGERATION SYSTEM

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In light of the current world energy situation and the growing environmental concerns over the increased levels of greenhouse gases mainly associated with energy production sector, this research effort becomes significant, through the development of an adsorption refrigeration system. Adsorption cooling systems do not currently enjoy widespread use, but they have gained considerable attention as an alternative to traditional cooling systems because they utilize low grade temperature waste heat source to provide cooling continuously.

"A multi-bed (4 beds) adsorption refrigeration system was modeled based on the use of activated charcoal/methanol pair, and a numerical algorithm was developed to study its performance. The model was used to investigate and illustrate heat transfer, mass transfer, and thermodynamic behaviours of the absorption refrigeration system."

The system operates by causing methanol to desorb and adsorb simultaneously in two separate adsorber beds, while the other two beds are being heated and cooled to proceed to the desorption and adsorption processes, respectively. A novel control strategy to automate bed switching was investigated, which uses bed pressures and water flow rates to control the switching time. This strategy allows the system to vary the cycle time in response to changes in external input parameters. The model also considers pressure variation during adsorption and desorption processes, the impact of which is usually ignored in other research efforts. The model was used to conduct a parametric study to determine the effects of key operational parameters including water flow rates, heat source temperature and evaporator temperature on the performance indicators of coefficient of performance (COP), specific cooling power (SCP) and cycle time. Using the results from the parametric study, performance curves of SCP and COP were developed which can be used to select suitable operational parameters for the adsorption system. The dynamic model revealed that significant pressure variation can occur in the desorbing bed and condenser.


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DEVELOPING A CULTURAL CONTAINER: THE ROLE OF PUBLIC VISUAL ART IN KINGSTON'S ARCHITECTURE

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MASTER OF ARCHITECTURE (M.ARCH)

"This research will explore this relationship between Architecture and public visual art as it relates to portions of Kingston and St. Andrew, Jamaica, West Indies, through data collection, case studies, comparisons with foreign territories, and critical analysis."

Architecture as an intellectual structure or conceptual organization bridges the gap between 'concept' and 'expression', and additionally establishes an environment in which an expression can be meaningful. In the context of the built environment, it involves fabricating and/or organizing elements to facilitate human functionality. Its language however, is yet to be fully comprehended by the Kingston populous; even though there are forms of public visual art (expression), such as murals and sculptures, within the city that are currently more easily understood. With this said, a re-established partnership between architecture an inherent part of the metropolis and public visual art, and simultaneously architects and visual artists (both of which share the grounds of visualizing the ideas of clients), would form an effective force in developing a physio-social environment that articulates identity in creative and innovative ways, or, a 'cultural container'.

DAL FRAMEWORK FOR IT PROJECT IMPROVEMENT AND MANAGEMENT BY PMOS IN THE PUBLIC SECTOR

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In response to economic forces which are driving organizations to streamline their processes on the principle of performance and economic efficiency, many organizations have established a Project Management Office (PMO) to implement this strategic objective. However, despite huge investments in PMOs, research indicates that there exists a high level of project failure.

> **“Research has shown that IT projects and public sector PMOs realize less success than those in other industries. Several theories have been put forward on how to successfully implement the correct PMO structure for optimal project success, however, the fact that very little academic evidence exists to support these theories makes them largely anecdotal.”**

We have developed a tool called the Direct Approach for Linkages (DAL) Framework for the project management office (PMO) that can be used to improve the success rate of public sector IT projects. The purpose of this study is to aid in addressing the void of academic knowledge in the public sector between project success rates and PMOs by applying the DAL Framework for IT Project Improvement and management by PMOs in the public sector. The DAL Framework was evaluated using the DAL framework to assist in developing further the role and responsibilities of the PMO to function at the project level and achieve increases in IT project success rate.

MEASURING PROJECT SUCCESS USING DIFFERENT CRITERIA IN GOVERNMENT ORGANIZATIONS

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“This research employs four projects from different industries in Jamaica to apply the perspectives of the Project Performance Scorecard and IS Success Model measurements, and triple constraints method to evaluate project performance.”

Studies to empirically apply multiple performance evaluation techniques, including the traditional approach to assess the performance of government projects, tools and techniques, including performance evaluation techniques, organizations including governments are still replying on outdated or insufficient tools.

We posit that the increased application of alternative approaches to highlight the important dimensions of the project process can help to address this issue. With the increased application of newer techniques over time, stakeholders can be equipped to better identify sources of failures and successes and improve the management of project. This is crucial for the IT projects that are consistently perceived as underperforming.

DEVELOPING A NATIONAL DISASTER RECOVERY FRAMEWORK WITH AN AIM TO BUILD THE RESILIENCE OF GOVERNMENT SYSTEMS IN JAMAICA

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Disaster recovery is an issue of national importance. The security of government information systems in developing countries such as Jamaica is critical to the sustained development of the island's economy. Every organization, at some point in time, will face a disaster, whether it is a power outage, data center meltdown, a major hurricane or a virus attack that corrupts mission critical files. Yet despite this, many Government of Jamaica (GOJ) institutions still operate without a complete disaster recovery plan.

> **"The purpose of this study is to develop a disaster recovery framework geared at bolstering the resilience of the Government of Jamaica (GOJ) IT infrastructure. The framework integrates the principles of ISO 22301 and National Institute of Standards and Technology (NIST) to provide a holistic guide in developing a disaster recovery (DR) framework to facilitate the efficient recovery of critical data and information systems assets from natural and man-made disasters and catastrophes."**

The framework includes pre-disaster preparedness, disaster mitigation and recovery, and continuous assessment and evolution to maintain the information security assets. Many businesses that experience a disaster whether natural or man-made and have no emergency plan will never reopen, while, those that reopen have a high probability of failure within two years. This underscores the importance of establishing a national disaster recovery framework to ensure government businesses will continue to operate despite a catastrophic event.

DEVELOPING A NATIONAL CYBERSECURITY FRAMEWORK FOR JAMAICA: A DESIGN APPROACH

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The cyber-security landscape is continuing to evolve and it is therefore important for countries to understand the dynamic forces and be able to foresee the potential risks and vulnerabilities and stem them. One approach is through the development and implementation of proactive strategies, policies and procedures that is guided by a cyber-security and framework which has significant implications for our national security and development.

> **“This research project therefore seeks to develop a National Cyber-security Framework (JNCF) by adopting the design science methodology. JNCF will incorporate international standards and industry best practices to protect the confidentiality, integrity and availability of national information in Jamaica and serve as a potential blueprint for both the private and public sectors within Jamaica.”**

As Jamaica embarks on its 2030 vision of e-powering Jamaica, it has now become prudent to establish or begin to break the ground to promote a safe cyberspace for all Jamaican citizens. To achieve this goal, the design science methodology was chosen to create an artifact, Jamaica National Cyber-security that would include elements of international standards and industry best practice whilst maintaining its relevance in the Jamaican context. The opportunity now exists to align the goals of vision 2030 with a cybersecurity trust that will highlight the areas that need attention, policies, procedures and legislation. The challenge faced hinges more on the implementation of the framework as this will require dedicated resources which can be considered a scarce commodity in the present economic climate. To design the Jamaica National Cyber-security Framework (JNCF) a review of international standards namely ISO 27032, COBIT 4.1, NIST800-30 and guidelines from the European Network Information Security Agency (ENISA) and the International Telecommunications Union (ITU) were used to identify possible elements that may be applicable within the Jamaican context. The evaluation and rigor of this search were carried out with the aid of a scenario based cybersecurity incident. The events of this scenario were matched against

the JNCF to highlight and test how effective the elements of the designed framework would militate, prepare, and respond to a cybersecurity incident. It was shown that with the proposed enablers and asset pillars such as legal controls, people, critical information infrastructure, technical and operation controls had elements that would have prevented or reduced the effect of a cyber incident if one were to occur. Through the analysis of scenarios and the aid of the JNCF, it was found that the elements used to design this artifact contained strategies that can mitigate and respond to cyber threats. Recommendations for future studies include applying the Technical Acceptance Model which can provide further evidentiary support of the viability of this framework.

DATA MINING APPLICATION IN HIGH SCHOOL EDUCATION: AIDING CXC MATH AND ENGLISH PERFORMANCE USING CRISP-DM

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In spite of the slender improvements over the last decade the educational system in Jamaica is plagued with challenges. One of the major challenges experienced at the high school level is the continual underperformance of students in Mathematics and English Language. Educational Data Mining (EDM), an emerging sub-discipline is the process of discovering hidden patterns and knowledge within data from educational repositories (e.g. primary, secondary and tertiary institutions) and making predictions.

“The study applies the CRISP-DM methodology as a novel approach to undertake the set of coordinated steps in discovering hidden patterns and knowledge high school data in Jamaica. The study accentuates the different stages of the CRISP-DM i.e. business and data understanding, data preparation, modeling, evaluation and deployment using the RapidMiner software. The study also underlines the importance of applying a standardized process towards achieving useful results from modeling while highlighting some important lessons such as the maximization of data quality during data collection and preparation activities.”

The research is motivated by several reasons: (i) a process-based approach to data mining provides a clear roadmap to improving the efficiency and effectiveness of the data mining processes and improve credence in the data quality, analysis, prediction and results; and (ii) statistics invariably continued to show that there is a trend of low examination performance, particularly in subjects such as Mathematics and English Language, and is therefore a strategic opportunity to apply EDM principles in this untapped area. Combining these opportunities, the study has significant implications for policymakers and educators in determining approaches to improve students’ performance which in turn can impact national development.

ELECTROCOAGULATION OF MOLASSES-BASED DISTILLERY SPENT WASH: AN INVESTIGATION OF THE EFFECT OF OPERATIONAL PARAMETERS WITH PROCESS OPTIMIZATION

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Electrocoagulation is a wastewater and water treatment technology that has been in existence from the early 19th Century. This technology involves the use of sacrificial anode that decomposes when an electric current is applied, producing metallic ions that act as coagulant precursors promoting coagulation of contaminants present in the water and their subsequent removal. The use of Electrocoagulation for treating industrial wastewater is well documented, with high removal efficiencies for the contaminants involved.

> **“In this study, the effects of current density, initial pH, electrolyte concentration and electrolysis time on COD and colour removal were investigated. A 2nd factorial design augmented into a Central Composite Design (CCD), was used to develop statistical models for the optimization of the process parameters.”**

The Electrocoagulation process conditions were optimized through response surface methodology (RSM). Optimum conditions of current density were estimated at 60 mA/cm2, initial pH at 8.3; 8.6 g/L electrolyte concentration; and electrolysis time at 60 min. Maximum removal of COD and colour at optimized runs was 51.3% while for colour it was 94.7%.

The results revealed that electrocoagulation can be used to treat distillery spent wash. However, as a single treatment step for the waste, electrocoagulation is incapable of reducing the level of major contaminants within local effluent standards.

THE THEORY OF A CLOUD COMPUTING DIGITAL INVESTIGATION USING THE VIRTUAL MACHINE HYPERVISOR KERNEL LOGS

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DOCTOR OF PHILOSOPHY (PHD) IN COMPUTER SCIENCE

Cloud Computing has become a pervasive service commodity to all classes of traditional information technology users. This however presents opportunities for criminal activity due to a lack of the critical security infrastructure required by these abstract domains. Such likely criminal activities range from malicious insider threats of attack, data loss and leakage, having to deal with unknown user profiles, and the open sharing of virtualized technology resources across the physical infrastructure.

> **“This dissertation formally defines the theory of a Cloud Computing Digital Investigation by using a snapshot of the virtual machine (VM) kernel logs within the operating system environment.”**

The definitions are based on a finite state machine (FSM) computation model that was initially designed to support both fixed and removable physical devices. This computational model is used to define the VM’s history. The computational model of a computer’s history contains the primitive and complex states as well as the system events that had occurred. The goal of a Cloud Computing digital investigation is to develop inferences about these logical machines computer history. This approach is proposed using formal proof definitions, and a proof of concept prototype called a VM Log Auditor. The Hypothesis experiments conducted with the VM log auditor demonstrates the practicality of the software implementation and the resilience to attempt to disguise malicious VM computer activities. The resilience is achieved by detecting inconsistencies in the information used to infer the activity of the VM computer. The model and the prototype of the implementation were tested with data from a real VM hosted computer system. The resilience of the process to attempt to disguise malicious activity has also been demonstrated with practical experiments conducted with the same prototype implementation.

DOES PORTMORE LIVE UP TO ITS ASPIRATIONS OF BECOMING A CITY?

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> **“The research seeks to make a resolution of what the chosen study project, Portmore, is. It takes a neutral standpoint along the course of inquiry, though it admits that the object resembles a ‘city’, within a mainstream context.”**

However, the intention is not to be bounded by concept of a ‘city’, as this work, as an approach, is limitless in the quest for the answer, which may even lead to the notion of a different kind of city. After a brief history of the area of Portmore and its evolution into our time, coming from a vast marsh land into a large housing development, with schools and commercial centres, the issue is raised of whether the object is a city.

As cities are dynamic in nature, issues of contemporary thought are examined in relation to traditional viewpoints of cities and the elements that come together to form such. The research approach taken was that of a qualitative, observational and exploratory research because of its suitability in this regard.

The use of interviews, site visits and analyses of the area were conducted. In addition, there was a comparison of the study object in relation to two chosen sites, Curitiba, Brazil and Stockholm, Sweden which were selected because they were deemed to reflect sustainable approaches to urban planning and living. The research concludes with the determination of the study object and recommendations for further positive developments of same.

URBAN OASES: A STUDY OF GARDEN COURTYARDS IN KINGSTON, JAMAICA

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> **“The term ‘urban oasis’ refers to public open spaces in an urban setting like parks, public gardens, piazzas/plazas, spaces and courtyards connected to public buildings. These public spaces are often located in between buildings or are enclosed by surrounding buildings in an urban setting. They are common to all parts of the world, in all climates and cultures and exist in various sizes.”**

Central Park in New York City, Hyde Park in London and Hope Gardens in Jamaica are considered very large urban oases. They boast areas of 843 acres, 350 acres and 220 acres respectively. By contrast, Central Library’s Plaza in Los Angeles of 5 acres or Emancipation Park in New Kingston, Jamaica, of 7 acres are considered to be very small in relation to the size of the cities they serve. Regardless of size, they are used by residents and visitors for relaxation, exercise, as meeting places as well as for cultural activities. Plant material is usually used to provide shade, relief from views of the urban landscape, and, along with foundations and other devices, helps screen out the busy, noisy and polluted environment of the surrounding street or business district.

Many countries invest in these spaces because of their role in creating an identity for the locale. They usually become public icons, well known by residents and tourists alike and also provide economic benefits to their communities.

In New York City, land values are highest around public open space as is the case of Bryant, Central and Riverside Parks. The WaterFire night event in Providence, Rhode Island is another example of an urban oasis adding value to the community. During the summer and early fall, bonfires are used to give out pleasant pleasing smells of aromatic wood. This, combined with live music, creates a public cultural event that brings people into this central urban area to walk, gather and eat. In much the same manner, the lawns of Devon House, Jamaica, are often used as the setting for culturally significant activities like

craft markets, art exhibitions like the annual Jamaica Observer Food Awards. Urban oases also help to enhance the beauty and environmental quality of their surroundings. This includes maintenance of the quality of the atmosphere, operation of the hydrological cycle including maintenance of the quality of the atmosphere, operation of the hydrological cycle including flood control and drinking water supply, waste assimilation, recycling of nutrients, generation of soils, pollination of crops, provision of food from the sea, and maintenance of the vast genetic library. Well-designed open spaces contribute towards ecological diversity, support environmental sustainability and help to counter pollution. Within urban open space, varied habitats help to relieve the monotony of the urban landscape with different colours and sounds and help to bring the delights of the countryside into our towns.

LANDMARKS AND THE CITY – MAPPING KINGSTON'S LANDMARKS AND EXAMINING THEIR SIGNIFICANCE IN CREATING MENTAL MAPS FOR NAVIGATING THE CITY.

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Urban landmarks are dominant visual elements with associated cultural meaning. Particularly dominant landmarks may even come to represent 'urban identity'.

"There are local landmarks in Kingston but these have never been studied in order to ascertain what urban features members of the public acknowledge to be significant landmarks, and how they are used in the navigation of the city. The original hypothesis perceived landmarks as dominant vertical elements, but after surveying sixty (60) individuals in Kingston, the key findings indicated that the open-to-sky green spaces were perceived as landmarks and formed key components of mental maps."

Further to these findings, this study proposes firstly, that urban designers be cognizant of the significance of green spaces in a tropical, low rise urban context. Secondly, the study unearthed "blind spots" in the urban fabric – violence prone inner-city communities which lacked any significant landmarks, and which are segregated from the rest of the city. This situation needs addressing.

DESIGN AND EVALUATION OF A TABLET DOSAGE FORM OF AMLODIPINE BESYLATE IN COMBINATION WITH HYDROCHLOROTHIAZIDE

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Year Submitted:
2011

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MASTER OF PHILOSOPHY (MPHIL) IN PHARMACEUTICS

“The study was designed to generate pre-formulation data on amlodipine besylate- and hydrochlorothiazide for co-formulation into tablet dosage form using various tableting excipients. Compatibility between active drug substances and the additives was investigated using the Differential Scanning Calorimetry (DSC) and confirmed with the isothermal microcalorimetry.”

The fluidity and compressibility of granules of five different formulations of the active ingredients were characterized. In addition, the physic-mechanical properties i.e. crushing strength and friability, biopharmaceutical properties i.e. disintegration time and dissolution rate of the active ingredients, assay, and uniformity of content of active pharmaceutical ingredients were evaluated. DDSC 25 machine was calibrated with zinc and indium, the actives were combined using a mortar and pestle in a ratio of 1:1, 1:2, 2:1 and compressed into tablet on a Carver Hydraulic Press. Samples of crushed tablets were scanned over a temperature range of 160oC to 340oC. The angle of repose and compressibility index of the different powder formulation mixtures of amlodipine and hydrochlorothiazide were determined. The formulations were then compressed into tablets at 78.56 MNm-2, 235.68 MNm-2 and 314.25 MNm-2 compression pressures. Tablet tensile strength, density, disintegration and dissolution rates were assessed.

The results indicate that amlodipine besylate and hydrochlorothiazide are compatible and could be formulated in a combined tablet dosage form. It was observed that amlodipine besylate may play a role in improving the thermostability of hydrochlorothiazide at higher temperatures.

Tablet formulation of the highest quality was selected using the Heckel plot parameters, disintegration times and dissolution rates. From the fluidity, compressibility and finished tablet properties, it was concluded that the formulation with 25% dicalcium phosphate and 75% microcrystalline cellulose compressed at 236 MNm-2 or 1.5T force gave the best design and functional performances. The formulation has a packing fraction of 1.0, disintegration time of 40 seconds and a release rate greater than 75% of both actives within 10 minutes of dissolution.

MODELING OF POWER SYSTEM ECONOMIC DISPATCH DATA USING THE MULTILAYERED NEURAL NETWORK

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Economic dispatch is an essential part of power system operation if the utilities are to operate their generation facilities efficiently and profit on investments. Over the years engineers and researchers have devised several methods to determine the economic dispatch solution for their power systems. These methods have primarily been based on mathematical optimization techniques such as Gradient Descent or Newton's methods. However as the fossil fuels we depend on become depleted and the power system market becomes more competitive engineers and researchers are looking toward more accurate and robust techniques for obtaining the economic dispatch solution. The new techniques being investigated are primarily based on Artificial Intelligence (AI) techniques, more specifically Genetic Algorithms (GA) and Artificial Neural Networks (ANN). These techniques are being investigated because of the inherent ability of AI algorithms to handle nonlinearities and noisy or incomplete data. In addition AI techniques are being applied to the area of power system modeling where the primary objective has been to model the behavior of the demand placed on the power system by its customers.

> ***"This study uses ANN techniques to model historical power system economic dispatch data supplied by JPSCo. Ltd., more specifically it uses the Multilayered Neural Network (MLNN) to extract the intelligence from a large pool of data that maps the outputs of a power system's generators and its demand to the future outputs of the generating units. This is as a first step toward predicting the future behavior of a particular generator in the power system based on current data for contingency handling, maintenance scheduling, system analysis, etc."***

The ability of the MLNN to model the economic dispatch data of generators in a power system is assessed by training on data obtained from the Jamaican power system utility. The performance of the neural network is judged based on how well it is able to reproduce training outputs and how well it produces correct outputs from input data that it was not

exposed to in training. The results show that when the MLNN is trained on complete sets of data, data without any gaps or missing interval, it is able to reproduce the general behavior of test target data. The test target data represents data that the MLNN was not exposed to during the training phase. The results also show that when trained on the entire data set, with incomplete data included, the MLNN produced more accurate results than when trained on the complete data sets alone. This is testament to the robustness of the MLNN as it is able to produce more accurate results from more data even if the data has some inconsistencies and noise.

OPTIMIZING OF CRYSTALLIZATION PROCESS CONTROL AT WORTHY PARK ESTATE LTD.

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The advent of a recent World Trade Organization (WTO) ruling stipulates the removal of Preferential Markets for Raw Cane Sugar manufactured by African, Caribbean and Pacific (ACP) countries in the year 2005, to be fully implemented by 2010. Worthy Park Estate Ltd is one among many Sugar Producers that will be forced to compete on the World Market for sales of its product. Being cognizant of the WTO ruling, this factory has already embarked on upgrading its plant to achieve the simple objective of producing a homogenous quality product, economically to compete at a World Market Price of Seven United States cents per pound (Lb). One of the many upgrading projects done was the automating of the Sugar Boiling Station. This system still relies on a mathematical computation for Syrup Party that ignores the upstream process nonlinearity, and the chronological irregularities between sampling by manual means. Additionally, the control of supersaturation during the crystallization process was restricted to utilizing an inference from gravimetric solids measurement (brix) which could not compensate for changes in purity of the Primary Ingredients. To facilitate the criteria for consistent final product, more accurate methods of determining characteristic elements of the primary ingredients are needed to better define the quantitative parameters for any particular boiling sequence in real time. The current method of using mathematical computation and chronological sampling flawed with irregularities are not the optimal in real time situations where the process conditions are inherently dynamic and process characteristics are nonlinear.

> ***“This thesis presents a novel solution that addresses the foregoing limitations which will optimize the control of supersaturation in the Crystallization Process during Vacuum Pan Boiling at Worthy Park Estate Ltd. The objective of this research is to develop and simulate models of the supersaturation parameter which can be incorporated into the current conventional automated systems. It builds on the foundation of modern methods to determine the purity parameter on line, thereby allowing the use of neural networks to complement the supersaturation models.”***

A Neural Network scans the stream of measured parameters of the primary ingredients and outputs optimizing parameters which complements supersaturation models for incorporation into a Proportional, Integral and Derivative Control System for Supersaturation Control in any particular boiling sequence in real time to achieve consistent final product. Actual data recorded of the present automation system are presented in which the improvements in exhaustion are highlighted, in addition in which the improvements that portray the limitations of the existing control system. The results of a simulated vacuum pan boiling using a hybrid of real time, boundary defined random data, and the two classes of supersaturation coefficients developed, are analyzed statistically to highlight the hypothetical gains and benefits, and sustainability of the proposed solution. Additionally, deviations from expected results are discussed and ensuing scope for further work is presented.

INVESTIGATION INTO THE EMULSIFYING PROPERTIES OF BLIGHIA SAPIDA (ACKEE) OIL

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NAOMI ANDERSON-FOSTER

Supervisors:
DR. SARAFADEEN ADEBAYO
PROF. NILZA JUSTIZ-SMITH

Year Submitted:
2009

Degree:
MASTER OF PHILOSOPHY (MPHIL) IN PHARMACEUTICS

“This study was designed to investigate the emulsifying properties of a lipid extract obtained from Blighia sapida, L (ackee), family Sapindaceae.”

Dried arils were milled and extracted in sohxlet apparatus using petroleum spirit. The extract was cleaned with 1% activated charcoal and concentrated on rotary evaporator to constant volume. The lipid (SPAo1) obtained was subjected to classical titimetric and instrumental analysis. Gas chromatography was used to confirm sample purity and absence of residual solvent.

Study designs were generated using DOE® Fusion One software to determine various combinations of Hydrophile-Lipophile Balance (HLB) and mixing time. Emulsions of SPAO1 were prepared using different emulsifying agents and different emulsification techniques, and were evaluated for physical stability and globule size distribution. Emulsion types were also assessed with ruthenium red stain. A model drug, clarithromycin, was incorporated at different concentrations in the most stable emulsion, with or without sodium carboxymethhyl cellulose (NaCMC).

The SPAO1 content of dried ackee aril was 50±5% w/w on dry weight basis. This was much higher than what obtains with most common vegetable oils. The sample has a bright yellow colour with characteristic nutty smell and density, dynamic and kinematic viscosities of 0.907g/cm-3, 63.41 cP and 45.33 cSt at 25oC respectively. Stable emulsions were obtained at HLB 4.5 – 6.5, suggestive of water-in-oil emulsion. However, staining and microscopic analysis confirmed emulsions to be oil-in-water type. In the optimization studies, emulsifier at HLB 6 produced the most stable emulsion in terms of creaming stability and globule size distribution. Clarithromycin emulsions at HLB 6 were not stable; however incorporation of NaCMC significantly improved stability. Generally, SPAO1 compares well on physicochemical properties with commonly employed oils and a stable emulsion at low HLB of the substance was obtained. Contrary to the expected water-in-oil emulsion at low HLB of 4.5-6.5, physical, microscopic and staining reactions confirmed SPAO1 emulsions to be oil-in-water type. Although the observed low HLB for SPAO1 oil-in-water cannot be readily explained, emulsions produced consistently tested positive for oil-in-water product. Further studies should be conducted to confirm and establish the reasons behind this deviation from the norm.

TRIBOLOGICAL AND CORROSION STUDY OF MECHANICAL HARVESTER BLADES USED IN THE JAMAICAN SUGAR INDUSTRY

Student:
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Supervisor:
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Year Submitted:
2008

Degree:
MASTER OF PHILOSOPHY (MPHIL) IN MECHANICAL ENGINEERING

The frequent sharpening and changing of mechanical harvester base cutter blades, due to wear and corrosion, has impacted negatively on the financial operation of the Jamaica sugar industry in harvesting sugar cane. Hence, this study is geared at the improvement of efficiency and economic gain of the Jamaica sugar industry. To achieve this, a sound scientific knowledge of the mechanisms associated with wear failures of mechanical harvester base cutter blades are considered to be the first step.

> ***"In this study the surface of the mechanical harvester base cutter blades was coated using two primary thermal spray processes: the electric wire arc spray and high velocity oxy-fuel (HVOF) spray process. The electric wire arc spray was optimized using a fractional factorial Taguchi experimental design. Spraying parameters, such as arc current, arc voltage, spray distance, and air pressure, are identified as the significant factors affecting the efficiency of coating deposition."***

The coatings were characterized in terms of their potential as wear and corrosion resistant coatings. Microstructural characterization of the coatings was carried out using scanning electron microscopy, optical microscopy, and image analysis techniques. The performances of the four coating materials were compared with the performance of the uncoated/untreated mechanical harvester used by Jamaica sugar farmers. The materials were compared on the basis of; hardness, wear resistance, porosity, corrosion resistance, and cost. Two types of simulative wear tests were designed to represent the various environments in which mechanical harvester blades operate: an impact wear test and an abrasive wear test. The results indicated that under laboratory conditions, the abrasive wear was the most dominant mechanism by which the blades lose mass, as none of the blades showed any signs of wear during the impact test. In selecting the most appropriate material, coating process and coating position for application to the Jamaica sugar industry, it was found that the WC-NiMoCrFeCO coatings sprayed by the HVOF process had the best overall performance with

a compact microstructure and very little porosity when compared to the arc spray coatings produced. The corrosion performance of all the materials tested was evaluated using a potentiostatic electrochemical test cell to understand its behavior when placed in a typical corrosive environment, encountered by the average mechanical harvester blade on a daily basis. Each material was tested at pH levels ranging from 2.0 to 4.0 where it was found that the coatings all had similar responses to the electrolyte, in that the coating/substrate interface experienced extensive corrosion ranging resulting in delamination of the coating at the surface. On the other hand the coating surfaces displayed good resistance to acidic environments.

THE CREATION OF A MOBILE ENTERTAINMENT SERVICE BASED ON CONSUMER PERCEPTION AND AN ANALYSIS OF FACTORS AFFECTING THE ADOPTION OF THE MOBILE SERVICE

Student:
OPAL DONALDSON

Supervisor:
DR. PAUL A. GOLDING

Year Submitted:
2008

Degree:
MASTER OF PHILOSOPHY (MPHIL) IN INFORMATION SYSTEMS

The general trend within the mobile industry globally, is focused on the introduction of mobile data service to address declines in average revenue per user (ARPU). The high density of mobile devices within the Jamaican market is seen as a possible precursor to a decline in ARPU for voice communication.

> ***Currently, the existence of culturally and regionally specific content in Jamaica is limited therefore the aim of this research is to develop a culturally specific application based on consumer perception, which will enrich the mobile user's experience locally and regionally. The research utilized the Technology Acceptance model (TAM) as the base theory to investigate the factors which affected the adoption of the mobile entertainment (ME) service developed. A survey was carried out with 300 randomly selected participants to determine what ME application would be most appealing.***

The results suggested that respondents were primarily invested in a mobile learning application. From the results of the survey an online educational game was developed. Following the development a second survey was carried out with 159 participants to determine what factors would affect the adoption of the service created. The results showed that participants' intention to adopt the service was predominantly explained by the constructs – attitude, perceived ease of use and perceived usefulness. In addition, subjective norms explained a very small amount of variance within the model and the demographic factor age played a very marginal role in explaining intention to use and gender was identified as not statistically significant. This research is significant in providing a basis for the mobile industry to assess the factors which will play a role in the adoption of mobile data services and to contribute to the body of literature which focuses on the adoption of ME services using TAM model.

DEVELOPMENT AND APPLICATION OF A TESTING METHODOLOGY FOR RADIO FREQUENCY IDENTIFICATION (RFID) LIBRARY INVENTORY READER

Student:
VANESA TENNANT

Supervisors:
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DR. KENROY WEDDERBURN

Year Submitted:
2008

Degree:
MASTER OF PHILOSOPHY (MPHIL) IN INFORMATION SYSTEMS

Radio Frequency Identification (RFID) is an emerging technology slated to complement or replace barcode technology to identify, track and trace items in the supply chain. Public interest in the adoption of RFID heightened in 2003 when Wal-Mart mandated its largest suppliers to place RFID tags on shipped items on pallets by 2005. While the focus has been primarily on the supply chain, there are other industries, such as libraries, that have actively pursued RFID to revolutionize their operations. RFID allows libraries to automate the loan and return of library materials through real-time visibility of inventory. However, there is a surprisingly scarce testing in libraries.

> ***“This paper will suggest and execute a methodology to evaluate the RFIS inventory reader in a library. The research uses a design science approach, in particular, Hevner, March, Park and Ram (2004) prescriptive guidelines to develop a methodology for RFID performance testing in a library.”***

The methodology encompassed a design of experiment approach that investigates four factors: read angle (A), read distance (B), tag location (C) and shelf material (D). The findings suggested that read angle, read distance and tag location had a significant impact on the performance on the inventory reader. Despite the limitations in the methodology of the research for evaluating shelf material, the initial findings that the type of shelf material (wood or metal) had an impact on the read rate of the inventory reader. It is anticipated that the findings may help researchers and library practitioners to understand and further investigate methods to optimize the performance of the reader.

DESIGN OF AN ANALOG ELECTRONIC INTERFACE FOR A POWER LINE BASED TELEPHONY SYSTEM

Student:
ALEJANDRO BARRERAS GUTIÉRREZ

Supervisors:
DR. VICTOR WATT,
DR. GOSSETT OLIVER (UTECH)
DR. LUCIEN NGALAMOU (UWI)

Year Submitted:
2005

Degree:
MASTER OF PHILOSOPHY (MPHIL) IN ELECTRONICS & TELECOMMUNICATIONS ENGINEERING

This work is part of a collaborative effort to design and build a power line based telephony system. In particular, this research describes the design of the analog electronic modules and circuits to interface the standard telephony system concept with the power line technology used as the communication channel.

“In this research, a general measurement system is implemented in order to analyze the channel characteristics. The coupling network proposed in the consulted literature is built to perform measurements of the attenuation behavior in power lines. The measurements describe how the attenuation behaves, according to the frequency of the transmitted signal for an ideal power line with no loads and in a power line cable connected to the power grid in Jamaica. The necessary analog electronic modules that interface the system with power line communication technology are designed in this research and also simulated using electronic simulation software.”

This research considers MC-CDMA as the ideal transmission scheme to use in power line communication, while it is acknowledged that most high speed PLC chips now being marketed use an OFDM infrastructure. The software which controls the analog electronic interface was developed and debugged using the SX-DEV-C compiler. The software utilizes the virtual peripheral concept to optimize the performance of the system design. The complete circuit schematic diagrams for both the PCI-based PABX and the user transceiver board analog interface were also developed. Work is ongoing to compare in greater detail the MC-CDMA vs. OFDM performance for practical PLC channels. There is also ongoing work to use the results of this research to design and develop an integrated PLC VOIP phone using existing high speed PLC chips and VOIP software and hardware.

DEVELOPMENT OF A CRICKET BATTING TECHNIQUE ANALYSER/TRAINER

Student:
MARVIN KELLY

Supervisors:
PROF. MERVIN CURTIS
DR. MICHAEL CRAVEN

Year Submitted:
2004

Degree:
MASTER OF PHILOSOPHY (MPHIL) IN ELECTRONICS & TELECOMMUNICATIONS ENGINEERING

Over the years cricket has been a unifying force for the countries of the West Indies, and recently there has been a sharp decline in the standard of cricket in this region. From being the world champions the West Indies are now just struggling contenders. As the world becomes more technologically dependent, there have been numerous systems developed to enhance performances in various sports.

> **“In this research the development of a system that aids in the execution of cricket batting strokes is outlined. A thorough description of the batting strokes in cricket (provided in conjunction with a cricket coach) is presented and a mathematical classification of two batting strokes, using fuzzy value representation, is carried out. From the information provided by this classification a batting training system is suggested.”**

This expert system uses motion sensors to measure the elements of the classification. It captures the motion of a batter whilst playing a stroke. This is then compared to known strokes and feedback is provided which outlines how well the stroke was executed. This is an expert system and the analysis is done via a C++ program. This system was then used to analyze the motion of novice batters (batters from the Jamaica under fifteen cricket team) and an expert batter (the coach of the Jamaica under-fifteen team). The results presented are compared to the coach’s analysis for the same strokes. This showed that the system was not very effective in evaluating how well the strokes were played and the major errors can be reasonably attributed to the measurement system.

DEVELOPMENT OF A DYNAMIC MATHEMATICAL MODEL OF THE UPFLOW ANAEROBIC SLUDGE BLANKET REACTOR

Student:
DELROY ANTHONY PETERS

Supervisors:
PROF. SARIM N. AL-ZUBAIDY
DR. JACQUELINE BRIDGE

Year Submitted:
2001

Degree:
MASTER OF PHILOSOPHY (MPHIL) IN CHEMICAL ENGINEERING

“The Upflow Anaerobic Sludge Blanket Reactor has been modeled in this thesis using a semi-empirical correlation. The main objective of the modeling exercise was to examine the dynamics (hydrodynamics and transformation) of critical variables that are important for the reactor process design, performance and operation.”

These factors include some microbiological variables such as soluble organics (as COD) and biodegradable organics (as BOD), suspended solids (SS), and biomass concentration (as VSS). The hydraulic variables such as the upflow velocity of the liquid and by extension, upflow velocity of the solid and the volumetric fractions of the liquid (voidage) are also considered. The dynamics of external mass transfer of organics and inorganics and the transformation reactions within the reactor are modeled by five partial differential equations (PDE’s), which define dependent variables in one-dimensional temporal and spatial planes, an integrand equation for the gas rate of flow and an algebraic equation that defines the superficial upflow velocity of the liquid in the reactor. The PDE’s are solved using a simulation program that was written in Borland C++ language. The model defines the dynamics of the UASB in a simplistic way but which can be useful for engineering designs, dynamic simulation and control where the interest is in qualitative results using only the important quantitative inputs. The simulation was validated with data derived from the operation of a pilot model UASB. The pilot model was operated using raw domestic wastewater as substrate, which had an average total COD of 492 mg/L, soluble COD of 172 mg/L, BOD of 226 mg/L, suspended solid of 0.235 g/L and a relatively high sulphate content of 108 mg/L, and a COD/SO4 ratio of 5.0. The lowest HRT that was applied to the UASB was 5.5h. The average removal efficiencies were 50% soluble COD, 75% BOD, and 80% TSS. Curve matching of the simulation profiles, generated from the UASB model equations, and the experimental curves gave “fits” of 75%, COD, 40%, BOD 89% and 60% VSS.

THE DESIGN AND SIMULATION OF A WIND TURBINE ROTOR FOR MANUFACTURE USING APPROPRIATE TECHNOLOGY

Student:
ALWYN JOHNSON

Supervisors:
PROF. SARIM N. AL-ZUBAIDY

Year Submitted:
2001

Degree:
MASTER OF PHILOSOPHY (MPHIL) IN MECHANICAL ENGINEERING

In the past thirty years, Computational Fluid Dynamics (CFD) has been increasingly used for design and analysis as advances in computing technology have made computer simulation a relatively inexpensive avenue for modeling and design.

> **“In this work numerical methods are used to design and comprehensively analyse airfoils for Horizontal Axis Wind Turbine (HAWT) rotors. To ascertain the accuracy of the methods used and to determine where improvement in the methods could be initiated, the numerical data generated was compared with published experimental and test data of the existing NREL S809 airfoil. Once the methods were validated and standardized, two airfoils that incorporate the local operating environment and parameters that affect the aerodynamic performance were designed.”**

A CFD code was coupled with a simple numerical algorithm utilizing principles of the direct method for design optimization, to reproduce and modify the two airfoils in order to enhance performance. The super-ellipse equation was used to modify the shape of existing airfoils and to generate new cross sections based on the identified geometric influence on performance parameters. The newly created airfoils were constrained to facilitate their manufacture and maintenance using local technology and capability. Airfoil geometrical data was produced in a form suitable for manufacture using manually operated or numerically controlled machines. The result is four airfoils, which fulfill design requirements and satisfy local manufacturing constraints.

GRADUATE COURSES OFFERED

Graduate courses offered at the University of Technology, Jamaica include: Post-Graduate Diplomas; taught masters and doctoral degrees; and research degrees – Master of Philosophy (MPhil) and Doctor of Philosophy (PhD).

COLLEGE OF BUSINESS AND MANAGEMENT

School of Advanced Management

Name of Degree	Normal Duration	Entry Requirements	Possible Career Opportunities (This list is not exhaustive)
Doctor of Business Administration (DBA) with specializations in: **- Accounting** **- Finance** **- Management** **- Hospitality and Tourism Management**	4 yrs.	Applicants are expected to be holders of a graduate degree (MBA, MSc. MA) or equivalent, with a GPA of at least 3.0 on a 4.0 scale.	Manager in the different specializations, General Manager, Chief Executive Officer
Doctor of Philosophy (Ph. D.) in Business Administration with specializations in: **- Accounting** **- Finance**	3-5 yrs.	Applicants are expected to be holders of a graduate degree (MBA, MSc. MA) or equivalent, with a GPA of at least 3.0 on a 4.0 scale.	Manager in the different specializations, General Manager, Chief Financial Officer, Researcher, Lecturer
Master in Business Administration (MBA) with specializations in: **- Entrepreneurship** **- Finance** **- General Management** **- Hospitality and Tourism Management** **- Marketing** **- Agripreneurship**	18 mths.	Applicants are expected to be holders of a Bachelor's degree or equivalent in Business or other related fields, with a GPA of at least 2.70 on a 4.0 scale. **NOTE:** **Offered in Kingston & Montego Bay**	Manager/Officer in the different specialization, Research Analyst, Consultant, Entrepreneur
Master of Science (M.Sc.) in Finance with specializations in: **- Investment** **- International Banking**	18 mths.	Applicants are expected to be holders of a Bachelor's degree or equivalent in Business or other related fields, with a GPA of at least 2.70 on a 4.0 scale.	Manager/Officer in the different specialization, Securities Analyst, Consultant, Entrepreneur

COLLEGE OF HEALTH SCIENCES

School of Allied Health and Wellness

Name of Degree	Normal Duration	Entry Requirements	Possible Career Opportunities (This list is not exhaustive)
Master of Science Health Administration (MHA)	18 mths.	Applicants are expected to be holders of a Bachelor's degree or equivalent in a Health discipline, Business or other related fields, with a GPA of at least 2.70 on a 4.0 scale.	Health Professionals, Healthcare Executives/ Managers, Health Administrators, Consultant.
Master of Science in Public Health Nutrition	18 mths.	Applicants are expected to be holders of a Bachelor degree in the Natural and Applied Sciences, Health Sciences or other related disciplines from an accredited institution. Applicants must have a GPA of at least 2.70 on a 4.0 scale. Other professional certification may be considered on a case-by-case basis via Prior Learning Assessment.	Public Health Nutritionist, Nutrition Educator, Community Nutritionist, Research nutritionist, Food Policy Analyst, Nutritional Epidemiologist, Food Security Specialist, Consultant.
Postgraduate Diploma in Dietetics and Nutrition	1 yr.	Successful completion of a BSc. Dietetics and Nutrition or equivalent from an accredited institution.	Registered Dietitian, Food Service Operations, and Corporate Wellness programmes. Positions in Food and Nutrition related Business and Industries, Private Practice, Public Health, Research and Teaching.

COLLEGE OF HEALTH SCIENCES

Caribbean School of Nursing

Name of Degree	Normal Duration	Entry Requirements	Possible Career Opportunities (This list is not exhaustive)
Master of Science for Nurse Anaesthesia	3 yrs.	Minimum requirement: GPA of at least 2.7 (on a 4.0 scale) or lower second class honours degree or equivalent. Must be a Registered Nurse with at least five (5) years working experience. Midwifery qualification is optional. Registered Nurses without midwifery qualification will be required to complete twelve (12) weeks rotation in maternity units prior to admission. Must have a minimum of one (1) year operating theatre experience. Critical care nursing experience would be an asset. Minimum requirement may be determined by Prior Learning Assessment.	Nurse Anesthetist Designed for senior nurses who have completed the general nursing and midwifery education programmes and hold current licensure as registered nurses, registered midwives, and the accrual of professional nursing experiences in an acute care setting for a minimum of three years.
Post Diploma in Trauma Studies and Integrative Counselling **Master of Science in Trauma Studies in Integrative Counselling**	18 mths. 24 mths.	Applicants should have a first degree with at least a 2.7 GPA (on a 4.0 scale), or lower second class degree. Applicants with a first degree should have prerequisite modules in Introduction to Psychology and one of the following: Abnormal Psychology, Social Psychology or Health Psychology, or Applicants with years of practice providing trauma-related support may be considered by Prior Learning Assessment (PLA) determined by the University. Applicants should demonstrate awareness of emotional and mental well-being, motivation for study and emotional maturity.	Graduates will be prepared for work in private practice and organizations where various types of Counselling with an emphasis in Trauma are required.

COLLEGE OF HEALTH SCIENCES

School of Pharmacy

Name of Degree	Normal Duration	Entry Requirements	Possible Career Opportunities (This list is not exhaustive)
Master of Philosophy/Doctor of Philosophy (M.Phil./ Ph.D.) in Pharmaceutics with specializations in: **- Pharmaceutics** **- Pharmaceutical Technology**	2 – 3 yrs.	A Bachelor's degree in Pharmacy, Chemistry, Biochemistry or related field from UTech **or** any other accredited institution, with a GPA of at least 2.7 on a 4.0 scale.	Research and development in the pharmaceutical and nutraceutical industries, as well as academia.
Post Baccalaureate Doctor of Pharmacy (Pharm. D.)	3 yrs.	1. Applicants should be registered practicing pharmacist and clinical experience from an accredited institution. Applicants should have a minimum GPA of 3.0 or its equivalent. Applicants should have at least one year experience as a practicing pharmacist and clinical experience from a recognized institution. (Except for #2) 2. Special Entry* Bachelor of Pharmacy graduates with 3.0 or greater GPA	Community Pharmacist, Hospital Pharmacist, Research-Industry, Academia, Distributive, Administration, Regulatory & Clinical Consultancy.

JOINT COLLEGES OF MEDICINE, ORAL HEALTH & VETERINARY SCIENCES

College of Oral Health Sciences

Name of Degree	Normal Duration (Years)	Entry Requirements	Possible Career Opportunities (This list is not exhaustive)
Master of Science in Dental Therapy	2 yrs. 4 months of externship included	A Bachelor of Science degree in Dental Hygiene with a GPA of at least 2.7 on a 4.0 scale. Applicants who have relevant experience; evidence of having completed a programme in Dental Nursing with a minimum of two years of study and shall have been practicing for a minimum three years, and present written notarized proof may be eligible for entry upon review on a case by case basis via Prior Learning Assessment. Candidates with other types of academic qualifications will be evaluated in accordance with the University's regulations governing academic equivalence.	Graduates will be eligible to register and practice as Dental Therapists in a range of clinical settings. Graduates will have the opportunity to work as clinical teachers in the tertiary sector, in research and in oral health administration.

School of Public Health and Health Technology

Master of Science in Public Health (General) **or** **Master of Science in Public Health with specializations in:** **- Reproductive Health** **- Environmental Health** **- Dental Public Health** **- Health Education** **- Public Health Governance**	2 yrs.	Bachelor's degree with a GPA of at least 2.7 on a 4.0 scale in Pharmacy, Nursing, Dietetics and Nutrition, Environmental Health, Child Care and Development, Medical Technology and other Health Sciences and Allied Health, graduates of accredited degree programmes. Applicants with a pass degree would be required to complete qualifying modules. Prior Learning Assessment route of entry – applicants who have pertinent experience and present such portfolios would be eligible for entry upon review on a case basis.	Researchers, Educators, Practice in the Health Science Profession as: Nutritionist, Pharmacist, Environmental Health

FACULTY OF EDUCATION AND LIBERAL STUDIES

School of Technical and Vocational Education

Name of Degree	Normal Duration	Entry Requirements	Possible Career Opportunities (This list is not exhaustive)
Doctor of Philosophy (Ph.D.) in Career & Technical Education with specializations in: **-Business and Information Technology** **- Family and Consumer Studies** **Master of Philosophy (M.Phil.) in Career & Technical Education:** **- Industrial Technology**	4 yrs. 2 yrs.	All applicants for the M.Phil/ Ph.D. degree in Career & Technical Education are expected to have at least a Bachelor's degree with first class or upper second class honours, or its equivalent (at least 3.0 GPA) in the related career, technical, vocational education, industrial arts, or any related occupational education disciplines obtained from an accredited university or institution. Individuals are required to submit transcripts and satisfy an interview.	Principal, Curriculum Evaluator, Ministry Official (Technical Vocational Unit), Senior Teacher, University Lecturer, Career Counsellor
Doctor of Philosophy (Ph.D.) in Educational Leadership and Management	4 yrs.	All applicants for the M.Phil/Ph. D. degree in Educational Leadership Management are expected to have at least at Bachelor's degree with first class or upper second class honours, or its equivalent obtained from an accredited institution. Individuals are required to submit transcripts and satisfy an interview panel of their suitability to undertake doctoral studies.	Principal, Vice Principal, Educational Researcher, Ministry Official, University/ College Lecturer, Educational Administrator
Master of Science (M.Sc.) in Career & Technical Education with specializations in: **- Business and Information Technology** **- Family and Consumer Studies** **- Industrial Technology**	2 yrs.	Applicants should have a Bachelor's degree in the related career & technical education, vocational education, industrial arts or any related occupational education disciplines obtained from an accredited university or institution. They should possess a minimum GPA of 2.7. Preference will be given to applicants working in educational institutions, industrial training agencies, businesses and commercial enterprises. Individuals are required to submit transcripts and satisfy an interview.	Principal, Curriculum Evaluator, Ministry Official (Technical Vocational Unit), Senior Teacher, University Lecturer, Career Counsellor.

Master of Science (M.Sc.) Workforce Training and Education	2 yrs.	1st degree (Minimum GPA of 2.7 or Lower Second Class Honours). Individuals are required to submit transcripts and satisfy an interview.	Human Resource Manager, Curriculum Developer. Curriculum Evaluator, Adult Educator, Programme Evaluator, Consultant, Trainer, Teacher
Master of Education (M.Ed.) Educational Leadership and Management	2 yrs.	1st Degree (Minimum GPA of 2.7on 4.0 scale or Lower Second Class Honours). Individuals should be working in an educational or training institution or agency and have at least two years' experience in a context that requires them to carry out leadership and management roles.	Principal, Vice Principal, School Administrator, Grade Supervisor, University Lecturer
Postgraduate Diploma (PDE) in Education	2 Summer Sessions	Applicants should possess at least a first degree or the equivalent from a recognized, accredited institution, with a GPA of at least 2.7 on a 4.0 scale. They should also possess evidence of being able to provide a teaching timetable to meet Practicum requirement of twelve (12) hours weekly for **12 weeks** in an appropriate specialization at the **secondary or tertiary level.**	Lecturers, Teacher, Trainers

FACULTY OF ENGINEERING AND COMPUTING

School of Computing and Information Technology

Name of Degree	Normal Duration (Years)	Entry Requirements	Possible Career Opportunities (This list is not exhaustive)
Master of Philosophy (M.Phil/ Ph.D.) in Computer Science	2 yrs.	Bachelors Degree in Computing with minimum standard second class Honours or equivalent. Candidates will be considered based on the nature and scope of the research proposal submitted along with application forms and availability of supervisor in the research area.	Senior Computer Software Engineers, Computer Science Researcher, Computer Science Lecturer, Chief Technology Officer.
Master of Philosophy in Information Systems	2 yrs.	Bachelors Degree in Computing with minimum standard second class Honours or equivalent. Candidates will be considered based on the nature and scope of the research proposal submitted along with application forms.	Chief Information Scientist, Chief Information Officer, Information Systems Research, Information Systems Lecturer, VP Information Technology Operations, Strategic Technology Consultant
Master of Science in Information Systems Management (MSc. ISM)	18 mths.	Bachelors Degree in IT/IS/Computer Science or other related disciplines with second class Honours or 2.70 GPA from UTech or other approved institutions and two (2) years	Chief Information Officer, Chief Technical Support, Technical Officer, VP Information Systems, Project Manager
Post-Graduate Diploma in Information & Communication Technology (ICT)	14 mths	Bachelors Degree in Engineering in any discipline from a recognized tertiary institution.	

School of Engineering

Master of Philosophy (M.Phil./Ph.D.) in Chemical, Electrical, and Mechanical Engineering	2 yrs	Bachelors Degree in Engineering with minimum standard second class Honours or equivalent. Candidates will be considered based on the nature and scope of the research proposal along with application forms and availability of supervisor in the research area.	Director, Chemical Water Treatment, Chief Chemical Engineer, Researcher, Lecturer, Development Technologist, Production Chemist, Senior Process Engineer, Reliability Manager, Process Engineer, Chemical Engineer, Test Development Engineer, Environmental Engineer, Digital Engineer, Engineering Project Manager, Network Engineer, Computer Engineer, Senior Project Geologist, Chief Mechanical Engineer
Master of Science in Engineering with specializations in: **- Engineering Management** **- Renewable Energy Engineering**	18-24 mths	Bachelor of Engineering Degree OR a Bachelor of Science in Engineering OR a Bachelors Degree in a related science discipline. A minimum GPA of 2.7 is preferred from UTech, Ja. or any other approved institution. A minimum of two (2) years working experience is preferred.	Director, Chemical Water Treatment, Chief Chemical Engineer, Researcher, Lecturer, Development Technologist, Production Chemist, Senior Process Engineer, Reliability Manager, Process Engineer, Chemical Engineer, Test Development Engineer, Environmental Engineer, Digital Engineer, Engineering Project Manager, Network Engineer, Computer Engineer, Senior Project Geologist, Chief Mechanical Engineer

FACULTY OF SCIENCE & SPORT

Caribbean School of Sport Sciences

Name of Degree	Normal Duration (Years)	Entry Requirements	Possible Career Opportunities (This list is not exhaustive)
Master of Science (M.Sc.) in Physical Education and Sport (delivered at GC Foster College of Physical Education and Sport) **Note:** Applications should be sent to UTech, Jamaica	1 yr.	A Bachelor of Science degree, preferably in Physical Education or Sport Science; A minimum GPA of 2.7 on 4.0 scale; Candidates with other types of academic qualifications will be evaluated in accordance with the University's regulation governing academic equivalence. Entry through Prior Learning Assessment is available with experience in the appropriate subject areas.	Physical Education Instructor, Physical Education Teacher, Physical Education Coach, Sport Administrator, Sport Director, Sport Development Officer, Recreational Programmer, Researcher

School of Mathematics and Statistics

Master of Science (M.Sc.) in Mathematics Teaching (in collaboration with Church Teachers' College)	18 mths	The minimum requirement is GPA of 2.7 on 4.0 scale, or a lower second class honours degree, or its equivalent. Minimum entry requirements may be determined by Prior Learning Assessment. Within this context, any of the following admissions criteria are required: (i) A first degree with specialization in Mathematics (ii) A first degree with specialization in Mathematics and Education (iii) A first degree in another discipline but would be required to take foundation modules in mathematics and/or education (iv) a first degree in another discipline along with the certificate course in Mathematics offered by Church Teachers' College	Mathematics Educators up to level 1 in Bachelor's programme

School of Natural and Applied Sciences

Doctor of Philosophy (Ph.D.) in Chemistry	3 yrs.	A Master's degree (M.Phil. or M.Sc.) in Chemistry	Educators at Universities & Colleges, Researchers, Managers in Chemical Industries, Leaders of Analytical & Quality Assurance Teams, Consultants
Master of Philosophy (M.Phil.) in Chemistry	2 yrs.	A Bachelor of Science degree with minimum GPA of 2.7 on a 4.0 scale from UTech, Jamaica in Applied Science or Science and Education (Chemistry major) or Biochemistry, Pharmacy and Chemical Engineering, from a recognized accredited institution. Applicants will be considered based on the nature and scope of the proposed research.	Educators at Universities & Colleges, Researchers, Managers in Chemical Industries, Leaders of Analytical & Quality Assurance Teams, Consultants

FACULTY OF THE BUILT ENVIRONMENT

Caribbean School of Architecture

Name of Degree	Normal Duration (Years)	Entry Requirements	Possible Career Opportunities (This list is not exhaustive)
Master of Architecture (M. Arch.)	2 yrs.	Bachelor of Arts in Architectural Studies (Minimum Lower Second Class Hons.) or equivalent PLUS portfolio and interview.	Registered Architect, Urban Designer, Interior Architect, Landscape Architecture, Real Estate Development, Construction Project Manager, Architectural Visualizer, Lecturer, Architectural Critic

School of Building and Land Management

Master of Science (M.Sc.) in Built Environment with specializations in: **- Geomatics/GIS** **-Urban Design** **- Construction Management** **- Land Management**	2 yrs.	Bachelor's degree with a GPA of at least 2.7 on a 4.0 scale in a relevant area. Interview required.	Built Environment Specialist, Urban Design Specialist, Construction Manager, Property Manager, Property Assessor, Project Manager, Educator, GIS Analyst, Land Surveyor, Land Manager, Planner, Public Policy Analysis, Urban Planner, Environmental Resource Manager.

Master of Science (M.Sc.) in Sustainable Energy and Climate Change (in collaboration with **Caribbean Sustainable Energy and Innovation Institute (CSEII)**)	20 mths	Bachelor's degree with a GPA of at least 2.7 on a 4.0 scale in one of the following disciplines: (a) Built Environment or (b) Engineering or (c) Natural Sciences or related disciplines, **or** An Bachelor's degree in any other discipline plus (three years) relevant work experience in a related energy or climate change field, or Candidates with significant work experience five years or more); at a management level in the built environment, engineering or energy sectors; disaster preparedness and mitigation, or environmental management will also be considered, subject to Prior Learning Assessment and an interview to determine aptitude for graduate level work. All applicants will be interviewed.	Policy development and analysis specializing in Energy and Climate Change, Energy Demand forecasting and low carbon development, Energy Management, Renewable Energy developers, Climate Change Specialists, Disaster risk managers, Sustainable urban planners and developers, Green business entrepreneurs.
Master of Science (M.Sc.) in Integrated Rural Development	18 mths	A Bachelor's degree with GPA of at least 2.7 on a 4.0 scale **or** Prior Learning Assessment for candidates with significant work experience (five years or more); at a management level in a rural sector, Local and central Government and private sector.	Rural Development Specialist, Rural Project Managers, GIS Specialist, Rural Infrastructure Development Planner, Agro-Processing and Standardization Specialist, Rural Settlement Planning and Development Officer, Rural Entrepreneur, Lecturer, Policy Analyst, Climate Change Specialist, Disaster Risk Manager, Sustainable Development Planner

University of Technology, Jamaica

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