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E-Voting Challenges in Kenya

Samuel Mungai Mbuguah, Geoffrey Muchiri Muketha and Samuel Maragia

Abstract.

Many developing countries have had disastrous presidential elections in recent years. In most of these cases, it was alleged that manual voting and vote-tallying took too long to produce the winning candidate, leading to anxiety and fear among the electorate that the results were being tampered with. This often resulted in mayhem. This raises the question on whether e-voting could be a possible alternative to the manual voting system. Most of the developed countries have adopted one form of e-voting or another, but this has not been the case with developing countries. This paper investigates the challenges that are unique to Kenya, a developing country, with the aim of finding out whether there is an ideal e-voting system for such a country. To achieve this, the researchers conducted an extensive survey research where primary data was collected from eight out of nine constituencies where e-registration of voters was being done by the Interim Independent Electoral Commission (IIEC) of Kenya. Findings indicate the challenges to e-voting are: low level of computer literacy, poor Information Communication Technology (ICT) infrastructure, and unreliable power supply. These issues would pose a great challenge to e-voting implementation in Kenya. It is recommended that the e-voting solution should be simple in design and solar or battery powered.

Keywords: *E-voting, e-preparedness, manual voting, information communication infrastructure*

Modeling Devolved Governance Systems in Kenya Against Corruption by Using Game Theory of Social Behaviour

Alexander K. Opicho

Abstract

Kenya as any other developing country is challenged in its politics, governance and public sector economics by a social vice of corruption. In the developing countries, most of the central government institutions are overtly threatened by corruption which is both deliberate and unconscious break down in human morals by public servants. This is a challenging situation to governance both at centralized and devolved governance. These in turn gravitate to undermine democratic processes in the governance structures. Leaders at all levels have accepted wildness of corruption in the Kenya's governance system. Unfortunately, corruption as a social vice has been miss-understood as an isolated legal problem of the culprit. This is in stark contradistinction with a technical reality that corruption as institutionalized dishonesty is only a human expression of the systemic animal nature of tendency to dissemble or cheat as an ecological need to survive the competitive nature of biological and ecological games. Thus an act of corruption is an out-come of social-biological systems but not isolated legal problem. This paper therefore is focused on the intellectual need to explain human behavior of corruption as a challenge to devolved governance by using the mathematical model of game theory by applying the concept of prisoner's dilemma.

The paper will use a cross-sectional approach to examine 47 counties of Kenya that will be reduced to a sample of 30% of the target population from which data will be collected by observation and archival approach to analyze distinct game behaviors within the dynamics that accompany an act of corruption in governance structures.

Key words; *game theory, corruption, devolution, governance*

Influence of Leaders' Behaviour on Employees Service Delivery in Nyamira County Government

Kennedy Ntabo Otiso and Muganda Munir

Abstract

Leaders are entrusted with not only to manage the organization's affairs but also to interact with the general employees directly. They are responsible for communicating to employees the organizational goals, visions and mission. They are also responsible for maintaining and implementing organizational rules, culture and systems for enhanced efficiency. The aim of this study is to determine the relationship between leaders' behaviour and employee service delivery among Nyamira County Government units. A total of 113 frontline employees of the 3 subcounties of Nyamira County participated in this study. Data was collected by use of a questionnaire. The validity and reliability of the research instrument was done to ascertain the suitability of the research instruments. Data collected were analyzed statistically using descriptive methods with the help of SPSS software. The correlation analysis was conducted to determine relationship between leaders' behavior variables and employee service delivery variables. The rating of the variables of the study reveals that leaders behave in pro-subordinate manner having some weakness in pro-organizational behavior. The employee service effort was found almost perfect while the affective delivery accuses of different weakness. The inverse relationship between employee affective delivery and the leader's anti-organizational behaviour was revealed. A significance relationship between employee service effort and pro-organizational behaviour, pro-subordinate behaviour and, anti-subordinate behaviour was also revealed.

Key words: *Leader, Behaviour, Employee, Service, Influence, Service Delivery*

The Influence of Organizations Mission Statement on Employee Behaviour in University Campuses, Trans-Nzoia County.

Fibi Nelima Wanyama.

Abstract

The study examined mission statements of university campuses operating in Trans-Nzoia County, and how they influence institutional members work attitudes. Based on a survey of 20 members randomly chosen from selected departments of each institution, the study explored the state of staff awareness of their mission statements. The aim of the study was to establish the level of awareness and familiarity of the mission statement by employees in university campuses and how it influences their attitudes to work. The study is founded on the organizational learning theory which holds that an organization should create achievable long term goals and a future worth striving for. Similarly the strategic choice theory which is believed to determine organizational strategies as enshrined in the mission statement formed a further theoretical basis for the study. The main

variables of the study were mission statement familiarity and frequency of communication to employees and how they influence employee work attitudes. The study used both descriptive and quantitative research designs. Data collection instrument was the questionnaire that was self-administered to the respondents. Data was analyzed descriptively as well as inferentially using the simple regression analysis. The findings indicate that although all employees sampled were aware of the existence of a mission statement, most cannot completely recall it from memory, but they attest to the positive influence it has on work attitudes. Therefore universities must make an effort of regularly communicating to employees the importance of the mission statement to enhance their attitude to work.

Key Words: *Mission statement, work attitudes, mission communication, employee perception, mission awareness*

The Influence of Financial Reporting Practices on Organization Financial Performance of Manufacturing Companies in Bungoma and Kakamega County

Fwamba Rashid, Sungwacha Stephen, John Matete.

Abstract

This study provided an insight view of the influence of financial reporting practices on organization financial performance in manufacturing Companies in Bungoma and Kakamega County. The research was focused on three major objectives which included; the influence of cash reporting, budgetary reporting, inventory reporting and cost reporting on the financial performance of manufacturing companies. The study adopted descriptive and cross-sectional research designs, a study population of 150 employees, a sample size of 30 respondents study and registered 100% response rate, purposive and convenience sampling designs. Data sources involved both primary and secondary sources and data collection method was questionnaire. The data collected was presented in tables and analysed in percentages. A multivariate regression model was applied to test the relationship between the percentage of financial reporting practices and financial performance of the organization. The findings on the factors affecting financial performance were the financial staff competences, skills and knowledge enough to carried out accountability at the international standards, Managerial strategies, New initiations and innovations in products and services, Taxation that have influenced the financial analysis and hence limitation in financial performance growth of their organizations. The findings on the relationship between equity portfolio management& financial performance in the manufacturing Companies showed that there is a significant positive relationship between financial reporting and organizational financial performance .The recommendations on the financial reporting practices were that there is need to improve on the financial reporting practices of the referred companies to improve its financial reporting standards.

Key words: *cash flow, inventory, budgetary and reporting*

Effect of Reduction of Work-Life Conflict on Organisational Performance at Commercial Banks in Bungoma County

SUB THEME: Human capital Development

Getty Wekesa, Consolata Muyuka Khayinga, Catherine Laura Mamuli

Abstract

Although the connection between work-life balance practices and organization performance is well documented in strategic human resource management, a review of the literature, in various studies however, questions this purported link between reduction of work-life conflict practices and organizational effectiveness. The majority of studies investigating the outcomes of work-life practices does not measure work-life conflict, and thus cannot support this proposed mediated relationship (Eby, Casper, Lockwood, Bordeaux, & Brinley, 2005). This study has sought to draw new insights and research directions from the previous literature on general work-life balance practices and to organizational performance. We investigate effect of reduction of work-life conflict on organization performance.

The current study focused on testing the null hypothesis; - H_0 = as a result of the banking sector, reduced work-life conflict, there will either be no significant difference in employee job satisfaction or there will be a decrease. Effect of reduced work-life conflict and organization performance variables were examined. Descriptive research design was adopted which applied quantitative analysis using survey research methods. The sampling technique was stratified random sampling which employed to select 252 employees of the banking sector in Bungoma County. Analytical tools used in analysis were; factor analysis and bivariate regression analysis. The sampling was purposively picked. SPSS on XP Windows was used to produce results of a bivariate regression analysis. In conclusion, this current study finds support for the alternative hypothesis that a moderately strong positive relationship exists between reduced work-life conflict and organizational performance. Future research could numerically quantify on interval scale measurement the relationship between reduction of work-life conflict and organization performance. The market –based approach can provide another theoretical basis view of competitive advantage, in order to examine the effect of work-life conflict on organization performance. Lastly, the conceptual basis of further research can be extended wider.

Key Words:

Work –life balance, reduced work-life conflict, Job satisfaction, Organizational performance

Factors Influencing Inventory Management in Public Sector: A Case Study of Kajiado County Hospital

Nurwin Fozia Rajab, Saad Okwiri & Oruru Sebastian

Abstract

The aim of this study was to investigate the factors influencing inventory management at the public sector from which the researcher settled on Kajiado county Hospital. The various factors investigated were broken into Procurement procedure, lead time, supplier selection and e-

procurement. The objectives were to determine how procurement procedures including e-procurement influence inventory management at Kajiado County Hospitals. The study used thirty percent of the target population of officers from various departments who are responsible in inventory management to ensure that the customer demands are effectively and efficiently met. Information was collected from Forty five (45) of the targeted one hundred and fifty (150) respondents using structured and semi-structured questionnaires. Data was quantitatively analyzed using SPSS version 22 and presented as tables, graphs and the necessary measure of variance for effective interpretation. The key findings in the research indicated several challenges in inventory management such as limitation of scope from which suppliers are selected, lack of transparent supplier appraisal process, lack of transparent tender awarding process and pre-qualification of supplier not made public. Delay was another challenge which was caused by the processes of initiating a request for supplies to the supplier, non-availability of some pharmaceuticals from the Kenyan market or in the global market, legislation issues also come in to play as these products had to be authorized to be used in Kenyan market hence delays while awaiting approval and other logistical issues. Lack of e-procurement which could have been fast and reduce the delays. The study was of great importance to Kenyan government and donors it assisted in identifying areas of improvement in procurement process of such activities. To researchers the study formed basis for future research.

Keywords: *Disposal, E-Procurement, Surplus Property, Expediting, Efficiency, Effectiveness*

A Lexical Pragmatic Interpretation Of Selected Bukusu Circumcision Songs

Colleta Namubuya Simiyu

Abstract

This study presents a lexical pragmatic interpretation of the selected Bukusu circumcision songs. Most Bukusu circumcision songs use lexical items that are coached in figurative language. These lexical items portray men and women differently and are of necessity realized at the linguistic level; they exist in and derive their meaning from a linguistic context and are sometimes realized at the extra linguistic level. The figurative languages used in selected Bukusu circumcision songs include the use of symbols, metaphors and irony. The study therefore aimed at demonstrating that the lexical items used in selected Bukusu circumcision songs which have a single stable meaning in the linguistic system can nevertheless be used to express a wide range of distinct concepts on different occasions of utterance. This was done by carefully and selectively discussing a whole range of the symbols and metaphors used in selected songs. The study established that lexical comprehension of the selected Bukusu circumcision songs involves a process of ad hoc concept construction, based on information readily accessible from the encyclopedic entries of the encoded concepts and constrained by expectations of relevancy. Thus, our study made use of the lexical pragmatic processes of narrowing and broadening rounded in relevancy theory. The most suitable instruments for collecting data for the study was observation schedules, interviews, questionnaire and focus group discussions. The instruments were used to clarify how the way men and women are portrayed in Bukusu circumcision songs and expressed in the society is actually reflected during an active participation in the songs. From the songs we came to realization that all the lexical items discussed for instance those that exalt men and those that demean women suggest the infantile stereotypes that have long been a pre occupation for the Bukusu society. The figurative language used represents a complex relationship between men and women among the Bukusu. Our

discussion led us to the conclusion that in order to interpret the lexical items used in selected Bukusu circumcision songs, there must be something about the word that facilitates the transfer of meaning in such a manner that we understand the song. That is, the hearer's background information helps him/her to make correct inferences of the message. Effective communication depends on the shared knowledge between the speaker and the hearer, and the lexical pragmatic process of narrowing and broadening reveal this intention. The context in which the lexical items have been used helps in understanding the singers' message. Context is therefore of a great importance in the analysis of selected Bukusu circumcision songs.

KEY WORDS: *Bukusu, Circumcision Songs, Lexical Pragmatics: Narrowing And Broadening, Women, Men.*

Citizen service charter as a governance tool for quality public service delivery in Regional administration in Kenya: A case of Eldoret East Sub County

Sirai Chebet Sylvia, Gedion Boiyo Sirai and Felix Kiptoo Chesigor

Abstract

The purpose of the study was to investigate the application of Citizen Service Charter as a tool of governance on quality of service delivery in Eldoret East District Commissioners office. The objectives of this study were: to assess the effect of Citizen Service Charter on accessibility of administrative services by service seekers, TO establish the effect of provisions of grievance redress procedure in the Citizen Service Charter on the quality of service delivery, To establish the effect of Citizen Service Charter in promoting transparency and accountability in public service delivery, to determine the effect of Citizen Service Charter on customer satisfaction and to assess perception of government employees on the effect of CSC in improving public service delivery in Eldoret East. The theory of new public management was adopted to guide this study. On the basis of this theoretical framework, a conceptual framework was developed. Descriptive survey design was employed. The target population was 3500 consisting of service providers and service seekers, while a sample size of 350 was drawn from the target population. Stratified and random sampling techniques were used to select respondents who participated in the study. The research instruments employed were questionnaires. Data was analysed using Statistical Package for Social Sciences (SPSS 17.0). Descriptive statistics and inferential statistics were used to analyze the data collected. Data analysed was presented using tables, pie charts and bar graphs. The findings of the study showed that the use of Customer Service Charter has significantly improved delivery of public services at Eldoret East District Headquarters. The findings of the study were: most service seekers seeking services at Eldoret East District Commissioner's office had knowledge of the existence of service charters within the government offices, the main source of information on CSC was through notices on government offices, mass media, friends and public barazas, there was some significant improvement on the amount of time that service seekers spent while waiting to be served in government offices, there was an improvement in accessibility of services however there are few cases of citizens being denied services at government offices, service seekers were dissatisfied with the way in which their grievances were addressed by civil servants, there were a few cases where service seekers had to give bribes to obtain essential public services however there has been some improvement on accountability and transparency levels after introduction of CSC, with the introduction of CSC, citizens' satisfaction levels have increased and service provision had improved as compared to five years ago. The study recommends that: the government should ensure full implementation of CSC in the public offices countrywide, staff should be trained on

the benefits and effects of CSC in improving service delivery, government should diversify the means of communication to the public, the government needs to increase civil servants salaries to reduce incidences of corruption and to improve quality delivery services, the government needs to increase their staff through continuous recruitment so that the objectives of CSC can be achieved.

Key words; *Citizen Service Charter, administrative services, grievance redress, transparency, public service delivery*

Public Debt and Economic Growth in Kenya: An Auto-Regressive Distributed Lag Specification Approach

Umulkher Ali Abdillahi and Dr.Muganda Munir Manini

Abstract

The principal objective of Kenya's public debt management is to meet the government financing requirements at the least cost with a prudent degree of risk while the secondary objective is to facilitate Government's access to financial markets and support development of a well-functioning vibrant domestic debt market. However Kenya's public debt has reached unsustainable levels, mainly due to heavy government borrowing to fund massive infrastructure projects. The main objective of this study was to examine the relationship between public debt and economic growth in Kenya. Specifically, the study sought to assess the influence of external and domestic debt on economic growth. The study theoretical framework was premised on the endogenous growth theory. This study employed annual data covering the period from 1995-2015 collected from the World Bank African Development Indicators. The variables of interest were; public debt and its various components and economic growth measured as the real gross domestic product. To empirically analyze the impact of public debt on economic growth, the ARDL model specification was used to examine the long-run and short run nexus and dynamic interactions between public debt and economic growth using Autoregressive Distributed Lag (ARDL) cointegration test. The bounds tests revealed that the study variables were bound together in the long-run. The results for the computed Wald test (F-statistics) revealed that calculated F-statistics of 7.782 was higher than the upper bound critical value 6.650 at 1% error level. Based on this result, a level long run cointegration relationship exists for the estimated ARDL models. Thus, the null hypotheses of no cointegration are rejected, implying long-run cointegration relationships amongst the variables when the regressions are normalized on GDP. The estimated coefficients of the long-run relationship show that external debt has a significant impact on economic growth. A 1% increase in external debt leads to approximately 3.17 percent increase in GDP. The domestic debt has negative relationship with economic growth implying it has crowded out private investment. On an aggregate level, public debt plays a key role in augmenting the growth level in Kenya. The findings of the study will form a basis for the formulation of policies relating to future government financing programs and schemes.

Keywords: *Public debt, Economic Growth, ARDL Cointegration, Sustainable Development Goals and Kenya*

Effects of the Public Participation on the Sustainability of Development Projects

Munyua A.M.

Abstract

Governments and development agencies as well as private entities spend huge sums of financial and other resources in the implementation of public development projects. Some of these projects do not give the intended results, some fail even before they are completed while for others a few years after their completion, face numerous challenges, they have sustainability issues. From the literature review researchers have pointed out lack of public participation as one of the major contributor to this situation; in projects where the public is not involved in the identification and development of the projects, sustainability issues normally crop at different point of the project cycle. This conceptual study is mainly a literature review of public participation in development project and how it influences project sustainability. The study found that involvement of public or community in decisions that directly affect them produces positive results. In development projects, there are higher chances of contributing to the project reducing cost, the public gets to accept and own the project, and conflict is reduced; factors that contribute to the larger project sustainability. The study identified the need for empirical research in establishing whether the level at which public participation is conducted influences project sustainability. It also recommends that an empirical study be carried out comparing the projects where public participation was carried out at lower levels with those that engaged at the higher level.

Keywords: *Public participation, project sustainability, development projects*

Procurement Tendering and Suppliers Performance in Public Institutions: A Case of Moi University.

Pauline Keitany, Maureen Chepkensis Kipler, Isaac Kiplagat

Abstract

Public procurement system in Kenya has been characterized by a weak legal framework and lack of professionalism among public procurement practitioners. The objective of the study was to establish the effect of procurement tendering on supplier performance. The research design used was sample survey, where a number of suppliers in contract with Moi University are selected. The target population was 119 suppliers in the list of pre-qualified suppliers. The study adopted census for the suppliers to collect data; self administered questionnaires together with interviews schedule guides was used. Data was analyzed using both descriptive and inferential statistics aided by Statistical Package for Social Sciences (SPSS). The findings indicate that tendering procedures influence the performance of suppliers positively in Moi University. From the findings the majority suppliers were aware of the new government procedures as per the public procurement Act 2016 which enhances transparency, accountability, public confidence, professionalism and fair competition. The government needs to invest better research on tendering process, documentation and ownership transfer of contractual performance.

Key words: *Procurement tendering, Supplier Performance, Public Procurement, Contractual Performance, Procurement Practitioners*

Inter-relationship of Corporate Governance Mechanisms and Financial Performance of Coffee farmer's Co-operative Societies in Kenya.

David Musuya

Abstract:

The paper shows that the performance of coffee farmer's co-operative societies is a function of the interplay of corporate governance mechanisms: Board Size, Board Composition and status of the Chief Executive Officer (CEO). The paper has been built from that recommended a further research on the effect inter-relationship of corporate governance mechanisms and financial performance amongst coffee farmer's co-operative societies in Kenya. In essence to find out the effect of multicollinearity between the explanatory variables, but not high enough to cause serious problems. The research used the times-earned- interest as performance variable, guided by the null hypothesis that there is no relationship between the interplay of corporate governance mechanisms and performance. Indeed analysis results showed that there exist a relationship between performance and the interplay of corporate governance mechanisms in farmer's co-operative societies. Results from the all the societies investigated showed a correlation between performance and the governance mechanisms and that that corporate governance has a significant influence on the performance of business firms. Firms with sound governance mechanisms tend to better than those without. A board of size of 7, the separation of the role of board chair and chief executive officer, and the presence of non-executive directors were found to be good governance practice at the corporate level

Key Words: *Corporate governance, corporate governance mechanisms, performance*

County Governance on Universities' Autonomy and Academic Freedom in Kenya

Florence Wanjala, Sarah Likoko & Risper Wepukhulu

Abstract

Governance in higher education is inextricably linked to university autonomy and academic freedom. From the earliest beginnings of the university in the middle ages, down to the present century, autonomy or self-government has been the key ingredient in the ideology of institutions of higher learning. This ideology envisages the freedom or autonomy of the institution to make its own decisions on a broad complex of issues without interference from external, non-university agencies and political forces. It should also be qualified that universities' autonomy and academic freedom very much depend on the prevailing political system, since democracy by its nature guarantees autonomy while authoritarian form of political organization denies the concepts of autonomy and academic freedom. A more recent trend that has affected universities and attitudes towards their autonomous aspirations are cases where some University management and politicians have co-existed in an uneasy and conflictual relationship. Basing on this, the study therefore sought to analyze the effect of devolved governance on universities' autonomy and academic freedom. The objectives of the study were; to analyse the effect of County governance on University management and determine the effects of political ideologies on student leadership in Kenyan Universities. The study adopted survey research design and correlational research design. Data was collected by use of questionnaire, interview schedule and focus group discussion. The study findings of the study were; erosion of academic freedom, curtailment of university autonomy and ultimately deterioration in the quality of education. The study recommended the following; to depoliticize decision making on universities and their management, forums like

seminars and conferences need to be initiated with the objective of highlighting county governments' involvement in university education. Such forums would enable political leaders, civil servants and representatives of the university community to examine facts and issues that affect university governance. What seems quite critical is familiarization and confidence building measures that will assist in defusing suspicion and raise the level of interaction especially if there is prior recognition on both sides that there is need to tackle some issues.

Key Words: *County Governance, University Autonomy, Academic Freedom, University Management*

Ethical Leadership: A Theoretical Analysis of Kenyan Ethical Climate

Ripah Wepukhulu and Purity Nasambu

Abstract

Kenya has of the recent past been climbing up the ranks of corruption and according to a 2016 audit report by Price Waterhouse Coopers, Kenya achieved a rank of three as the most corrupt country just after France and South Africa. The web of corruption that has entangled all facets of the Kenyan society from crucial arms of government to local administrative units in villages to private sectors leaders and is slowly being fed to new generations. It has become our way of doing things, it's our Kenyan culture. Even with the endless efforts from anti-corruption agencies and regulatory laws to stifle corruption, it's a culture we just can't get over. Why? The prevailing Kenyan ethical environment provides a basis of analysis of ethical leadership with reference to a vast theoretical framework on ethical leadership which will help explain the complex nature of ethical leadership. The paper therefore highlights that it's beyond the bad apple analogy and corruption is more of a systemic problem applicable to the bad barrel analogy. Nonetheless the paper acknowledges that in a society where trust and integrity remains a mirage, ethical leadership is at the core of culture transformation. Possible recommendation to the Kenyan society as a whole and specifically to the Kenyan anti-corruption agencies are provided as possible solutions to tackling the vicious web of corruption in Kenya.

Key Words: Ethical Leadership, Organizational Culture, Corruption

Challenges facing return and Integration of Internally Displaced Persons in Uasin Gishu County, Kenya

Mark Joseph Maritim, Prof. Kennedy Onkware & Dr. Wycliffe A. Oboka

Abstract

Internally Displaced Persons (IDPs) resulting from 2007/2008 Post-Election Violence are found in various parts of Kenya. There are those who are still in satellite camps, those who returned back to their homes, those who relocated to other places, and those who are living with relatives or in urban areas. The purpose of this study was to investigate the challenges facing the return, integration and measure to be taken to help returned IDPs in Uasin Gishu County of Kenya. The study sought to establish the level of involvement of IDPs in planning their return, evaluate the challenges IDPs face on return and finally determine the extent of integration and measures to be taken to help returned IDPs. Descriptive cross-sectional survey research design was employed in

this study. Multi-stage sampling techniques were used to sample 349 returned IDPs households. Representatives from Humanitarian organizations were purposively sampled. The data for the study was collected using questionnaires, interviews and focus group discussions (FGDs). Secondary data was obtained from published and unpublished documents, government records and newspapers. Quantitative data collected in the field was analyzed using descriptive statistics. Qualitative data from FGDs and in depth interviews were analyzed qualitatively. The study found out that the IDPs were less consulted in the best way possible to manage their needs during the resettlement process and they didn't initiate their return home either. The study also found out that the main challenge faced by the returned IDPs was acute shortage of food and water. There was low integration of returned Internally Displaced Persons due to suspicions between returnees and host communities. The study recommended that trauma healing was still needed to enable reconciliation to take place. The study further recommended that the government should speed up the process of formulating a sustainable IDP resettlement policy.

Brand Identity and its effect on Performance of Public Sugar Manufacturing Firms in Western Kenya

Faraji Anduku Yatundu,

Abstract

Many organizations in the global market have realized that branding is an important initiative that they can put in place to ensure survival in the market. The sugar industry especially in Kenya has increasingly become saturated, attracting new and retaining old customers has not only become difficult but also costly in terms of marketing. The purpose of the study was to establish the effect of brand identity on performance of public sugar manufacturing firms in Western Kenya. The target populations of the study were members of the four (Muhoroni, Nzoia, South Nyanza and Chemilil) public sugar manufacturing firms in Western Kenya. Purposive sampling technique was used to select the 12 managers while simple random sampling was used to select the 43 supervisors and 119 clerks. The data was analyzed by using descriptive and inferential statistics and the findings indicated that, Brand Identity had a positive and significant influence on the performance of public sugar firms, it was recommended that the management of SMFs should invest more and ensure effective use of these branding attributes by putting more emphasis on use of branding strategies in order to enhance performance.

Key Words; *Branding, Brand Identity, Performance of Sugar Firms, Strategy, Kenya.*

Effect of Agency Banking on Growth of Commercial Banks in Bungoma County, Kenya

Shem Wangila Mukambi, Dr. Kadian Wanyonyi Wanyama Dr. Okumu Argan Wekesa

Abstract

The extent to which agency banking can be used as a tool for growth of commercial banks remains largely unstudied. The purpose of this study was therefore to establish the effect of agency banking on growth of commercial banks in Bungoma County. This study was therefore be guided by the following research objectives: to determine effect of technological advancement in agency banking on the growth of commercial banks, examine the effect of security in agency banking on growth of commercial banks, assess the effect of liquidity in agency banking on growth of commercial banks and lastly, to determine the effect of bank support in agency banking on the growth of commercial banks. The research adopted Agency Theory and conceptual framework. This research adopted a descriptive survey and correlational research designs. The population of the study comprised of seven commercial banks operating agency banking in Bungoma County. The study adopted census method since the population was sufficiently small. Data was collected using questionnaires. Reliability and validity of the research instruments was determined through test and retest techniques on the piloted sample, which yielded an alpha of 0.797. The study used both the descriptive and inferential statistical tools to analyse collected data. Analysed data analysis was presented in form of frequency tables. Results revealed statistically significant and positive effects advancement in technology, security, liquidity and bank support and growth of commercial banks. The effect of agency banking was highest in bank support but weak in liquidity. The study concluded that investments in technology will result in more growth of commercial banks; increase in security would lead to more growth of commercial banks; a unit increase in bank support would lead to the growth of commercial banks and increase in liquidity would lead to increase in the growth of commercial banks. The following were the recommendations: commercial bank management should more in technology to make transactions more efficient and effective. Security should be enhanced in commercial banks by ensuring enough security measures being put in place to safeguard the customers' and agents funds. Banks should invest more in reliable security systems that are easily compromised. The banks should ensure that the agent has sufficient cash available to satisfy the need of the system through the settlement of funds and the provision of credit to customers, provide 24 hour access to funds and facilities to save/invest with safety. Banks should support agency banking through continual upgrade of their technologies, products and services; lending to businesses and individuals using sophisticated credit scoring systems and provision of 24 hour access to funds. The study intends to help commercial bank policy makers in identifying the key challenges involved in agent banking operations and come up with strategies that will lead to improve the growth of the commercial banks in Kenya.

Determinants of Growth of Savings and Credit Co-Operative Societies in Kakamega County, Kenya

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Abstract

Globally, the major goal of any business is profit maximization and wealth maximization. Savings and Credit Co-operative Societies like any other business in Kenya have been investing to fulfill this noble objective. Past studies have shown that lack of sufficient Growth of Savings and credit co-operatives has made it difficult for them to absorb their operational losses and even give returns to members, which has threatened their operation and hence some of them end up closing doors. The general objective of this study was to establish the determinants of growth of savings and credit co-operative societies in Kenya with particular attention to Kakamega County. The study specifically sought to achieve the following objectives: to determine the extent to which liquidity affects the growth of SACCOs; to examine how investments in SACCOs has affected their growth; to assess the effect of information dissemination on the growth of SACCOs and to determine the extent to which loan portfolio quality affects the growth of SACCOs in Kakamega County. Simple random and purposive sampling techniques were used to obtain respondents who participated in the study. Both primary and secondary data were collected in this study. The study adopted descriptive survey design. The study targeted 48 SACCOs with a population of 1,200 managerial and administrative staff. A total of 180 respondents were used in the study. Data analysis was done using descriptive and inferential statistics by entering the data into a Statistical Package for Social Sciences version software version 20. The findings were presented in form of frequency and cross tabulation tables. Results show that liquidity, investment, information dissemination and loan portfolio quality had statistically significant ($p < 0.05$) and positive effects on the growth of SACCOs in Kakamega. It was therefore, concluded that a unit increases of 0.401 of liquidity would translate to 40.1% growth of SACCOs; investment in the SACCOs by the stakeholders can result to enhanced growth of SACCOs; unit increase of 0.543 in the information dissemination can translate to 54.3% growth of SACCOs and a unit increase of 0.573 loan portfolio quality can result into 57.3% of growth of SACCOs. This implies that increase in loan portfolio quality leads to hastened growth of SACCOs. It was recommended that SACCOs should actively engage in increasing its financial base because solid financial status encourages the growth of SACCOs in Kenya and globally. SACCOs should make investment decisions like expansion, acquisition, modernization and replacement of long-term assets. The SACCOs need ensure efficient flow of information in their organizations so that no parties lack important market information needed for decision

making. SACCOs need to consider having a prudent management of the loan portfolio to avoid large portfolios in arrears with overdue loan repayments stretching back into the distant past. The findings may be useful to the management, employees, members, customers and any other interested party in SACCOs. The findings will also form a basis of future research by interested parties in the field of finance.

Adoption of Value-Addition Technologies among Mango Fruit Farmers in Machakos County

Kennedy Ntabo Otiso

Abstract

Mango is a highly seasonal tropical fruit, very popular among millions of people in the tropics. It also occupies a prominent place among the best fruits of the world. The impact of innovations is determined by the extent to which farmers adopt available innovations and the speed by which they take up the innovations. Among the technologies to be employed by farmers is the value addition technology, which is not just applied to post harvest, but also during the process of planting like Grafting of the indigenous varieties so that varieties which are marketable can be produced. The study was conducted in Machakos County about the factors that influence the adoption of value addition technologies among Mango fruit farmers. The study used both descriptive and correlational study design to describe and make a correlational analysis of the factors. Two hundred and thirty seven randomly selected Mango fruit farmers participated in the study. A questionnaire was used to collect data. The finding of the study revealed that majority of the farmers had sorters as their post-harvest handling technology. They also tend to agree that they have access to credit facilities; farmers have enough infrastructures to run value addition facilities. In addition, farmers agreed that they had technical skill to operate the machines, and were aware about the value addition technologies. The main reason why farmers do not use post-harvest handling technologies was due to high cost of acquiring the technology (64.6%). Farmers strongly agreed that they are motivated to use the equipment but the main hindering factor also was lack of awareness among the farmers (34.6%). The study recommended that farmers should be advised to utilize the available credit facilities to adopt value addition technologies so that more profit can be realized.

Analysis of Performance Appraisal Systems on Employee Job Productivity in Public Universities

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Abstract

Effective performance appraisal systems lead to motivated and strategic management of staff and implementation of the organization's strategic plan. The Universities appraisal system is meant to enhance the performance of employees by integrating an individual's goal with those of the organization. It entails objective setting, self-appraisal and feedback on performance and performance evaluation itself. Despite the Universities Management having an appraisal system, performance in public universities in the country remains relatively poor. The purpose of the study therefore, was to analyze performance appraisal systems on employee job productivity in public universities. The main objectives of the study were to determine the effect of self-assessment on the performance of employees in Public Universities, examine the effect of performance appraisal training on employee productivity in Public Universities, evaluate the extent to which the level of fairness affects the performance appraisal systems in Public Universities and establish the effect of communication on performance appraisal in public universities. The research study was carried out in four universities namely Masinde Muliro University of Science and Technology, Maseno University, Moi University and Jaramogi Oginga Odinga University of Science and Technology. Data collection instruments used was mainly questionnaire. Both content and construct reliability was carried out through engagement of experts in preparing the questionnaire. Piloting was done Laikipia University College, though the results were not used in the study. To ensure that the instrument is reliable, a Cronbach's Alpha of Coefficient of 0.876, was attained, which is far way above the recommended 0.7 in social sciences. The study employed descriptive survey research design. The target population will consist of 11,296 employees and 4 Registrars in charge of Administration. Purposive sampling will be used to select the four universities and four registrars. Data analysis was done using the statistical Package for Social Science (Version 20). Both descriptive and inferential statistics were used in data analysis. The results were presented in form of tables, charts and cross tabulations. From the findings, self-assessment, training on performance appraisal, level of fairness and communication had significant positive effect on employee job performance. It was concluded that an effective self-assessment results to improved employee job productivity; a further increase in performance appraisal training translates to increase in employee job productivity; an increase in level of fairness in performance appraisal improves employee job

productivity and improving the efficiency of communication and feedback mechanisms would result to improved employee job productivity. The following therefore were the study recommendations: public universities should proactively engage in putting in place mechanisms to enhance employee self-assessment among its employee and provision of training to the appraisers and appraisees should be boosted in order to effectively carry out PA to improve employee job productivity. The universities should ensure the performance appraisal system is fair, free of biases, political interference, or irrelevance by ensuring that outcome fairness, procedural fairness and interpersonal fairness are upheld during the exercise. Lastly, communication and feedback should be enhanced since they improve the effectiveness and help in decision making within the organization. The findings will contribute to the pool of knowledge in the field of Human Resource Management and will form the basis of reference by interested parties in future. The management of public universities will use the findings of this study to guide them in performance management. Furthermore, the findings will be a source of reference for academicians who intend to carry out studies in relation to the subject of performance appraisal systems.

Influence of Deposit Taking Mfis on Having Economic Empowerment of Busia County Residents

Fwamba Rashid, Sungwacha Stephen, John Matete.

Abstract

Microfinance has not achieved much publicity since its inception in 1970s by professor Muhammad Yunus. For a long time the perception was that microfinance was full of success stories as far as poverty alleviation is concerned with minimal critique. This study intended to examine the impact of microfinance in Busia County. Depending on the findings, the study was to make recommendations on how the situation (impact) can be made better. The study targeted members of deposit taking microfinance institutions in the area under study. By end of 2015, there were (8) DTMs operational in the Kenya (CBK). The study targeted 40% of the total DTMs operating in County. Thus, three institutions (40% of 8) provided the population; this is in compliance with recommendation by Mugenda who suggest that a sample of 10% of all the MFIs is ideal. The target MFIs provided an equal number of respondents (i.e. 40) to give us a population of 120. The study used primary data collection method. The data was collected primarily through structured questionnaire. Raw data collected was sorted and presented using tables and diagrams. The researcher used the Statistical Package for Social Sciences (SPSS) to analyze the collected data. A comparative analysis was used for responses from open-ended questions. The study found out that Sixty percent of the respondents indicated that self-employment drove them to joining microfinance while 40% indicated that control of resources drove them to joining microfinance. The study concludes that self-employment drove them to joining microfinance. Majority of the respondents, who own enterprise, indicated that they owned an enterprise which started before joining the microfinance Institution. The study finds that though Microfinance is available and accessible in Busia County, its impact on Micro-credit access is minimal. The study recommends need for prolonged period of successive borrowing, investing and repayments. This is because a majority of the clients access only small micro-credit facilities and operate micro-enterprises with low returns.

Effect of Firm Size on Environmental Accounting Practices among Listed Manufacturing Firms in Kenya

Sophie Naliaka, Muganda Munir and Ondiek Alala

Abstract

Environmental Management Accounting which is a recent development in accounting requires companies to report, apart from the conventional elements, the environmental aspects in their final accounts. Despite the entrenchment of environmental accounting in the financial reporting standards, there is little empirical findings of the extent to which companies have adopted it and the determinants of Environmental Accounting. Therefore, the purpose of this study was to examine the effect of firm size on environmental accounting among listed manufacturing firms in Kenya. In order to meet the objective of this study a quantitative panel data methodology was employed. The panel data was obtained from the audited financial statements of seven listed manufacturing and allied firms on the Nairobi Securities Exchange for the period of eight years (2007/08 – 2014/15). The panel data fixed effect estimation model was applied for the data analysis through SPSS. Findings of the study show that firm size has a positive effect on firms' environmental accounting practices. It is hoped that this finding will help the policy makers and management of various companies in adoption of environmental management accounting.

Key Words

Environmental Management Accounting, Firm Size and Fixed Effect Estimation Model

Influence of Automated System on Performance of the Nairobi Securities Exchange

Muganda Munir Manini, Umulkher Ali Abdillahi and Leena Vugutsa Mugadia

Abstract

Securities exchange markets play a vital role in the development of commerce and industry within a particular country which ultimately affects the economic growth of the host country. Technological advancement has played a key role in creating change within the securities trading. This study sought to examine the influence of automated system on performance of the NSE. Specifically this study examined the influence of electronic clearing and settlement, electronic ordering and electronic security transfer on performance of the NSE. The study was informed by Socio-Technical Systems Theory of Acceptance. It adopted a survey research design. The target population consisted of top executive and middle management staff/supervisors of 18 licensed brokerage firms and stratified random sampling techniques was used to select 96 respondents. Primary data was collected using questionnaire and it was analyzed using descriptive and inferential analysis. The results revealed that of electronic clearing and settlement, electronic ordering and electronic security transfer had significant positive effect on the performance. Further, electronic clearing and settlement significantly accounted for 67.1%, electronic ordering, 27.1% and electronic security transfer, 71.2% of variance in performance of NSE. It was therefore

recommended that investors and traders should be allowed to access any information from the automation system that is deemed crucial and critical to their decision making process, thus improving on market efficiency and share volume traded.

Key Words: *Automated System, Electronic Clearing and Settlement, Electronic Ordering, Electronic Security Transfer, NSE performance*

Adoption of Value-Addition Technologies among Mango Fruit Farmers In Machakos County

Kennedy Ntabo Otiso, Sylvia Sirai Chebet and Maureen Kiplel

Abstract

Mango is a highly seasonal tropical fruit, very popular among millions of people in the tropics. It also occupies a prominent place among the best fruits of the world. The impact of innovations is determined by the extent to which farmers adopt available innovations and the speed by which they take up the innovations. Among the technologies to be employed by farmers is the value addition technology, which is not just applied to post harvest, but also during the process of planting like Grafting of the indigenous varieties so that varieties which are marketable can be produced. The study was conducted in Machakos County about the factors that influence the adoption of value addition technologies among Mango fruit farmers. The study used both descriptive and correlational study design to describe and make a correlational analysis of the factors. Two hundred and thirty seven randomly selected Mango fruit farmers participated in the study. A questionnaire was used to collect data. The finding of the study revealed that majority of the farmers had sorters as their post-harvest handling technology. They also tend to agree that they have access to credit facilities; farmers have enough infrastructures to run value addition facilities. In addition, farmers agreed that they had technical skill to operate the machines, and were aware about the value addition technologies. The main reason why farmers do not use post-harvest handling technologies was due to high cost of acquiring the technology (64.6%). Farmers strongly agreed that they are motivated to use the equipment but the main hindering factor also was lack of awareness among the farmers (34.6%). The study recommended that farmers should be advised to utilize the available credit facilities to adopt value addition technologies so that more profit can be realized.

Fin Tech In The Competative Environment: Factors and Principles that Stimulate Fin Tech Growth.

Sungwacha Stephen M.

Abstract

Financial technology (FinTech) continues to receive much attention and promises to transform financial services industry. As this technology emerges there is a strong conviction that it will reduce costs and create new opportunities to the participants. And, although the development of FinTech is still in early stages, many believe that it will define and shape the future of the financial services industry, and at the same time increase participation by those who have until recently been

under- or un served. Fin tech is evolving in an environment that portends intense competition and there is a doubt of outright success in this space. Various factors, both internal and external, will impact on this rather highly fluid product providing technology. Survival in this market will rely on how best a participant positions itself in the market and meet customer expectations. This article demonstrates some key factors that determine the success of FinTech firms in this competitive industry. Some of these factors, termed the LASIC (low margin, asset light, scalable, innovative and compliance easy) principles have been mentioned. FinTech companies could benefit from applying some of the ideas presented in this article to their businesses. Methodology adapted will be a qualitative analysis of the key factors that continue to influence financial technology in the financial markets. The conclusion drawn is that in the ever changing financial environment consumers represent a key focal element. Firms should strive to manufacture products that meet the expectations of the changing needs of customers in the financial market- personalized services that provide convenience, security and connectivity. Connectivity can be achieved through smart phones ,wirables and across radio signals (FST (2015)).The financial market needs an integration of both social linkage and financial inclusion. FinTech expansion does not evolve in a vacuum. There will always be government and its agents ready to institute regulatory processes to protect both consumers and service providers. It is important to point out that regulation should be pro-tech rather than anti-tech. The regulations created should encourage growth of technologies like M-pesa because of the benefits that come with such technology.

Effect of Organiaational Capability on Market Perfomance of Postal Corporation of Kenya

Asisi G. Idah, Otiso Ntabo K, Munir Muganda

Abstract

The Postal Corporation of Kenya (PCK) was formerly part of the larger Kenya Post & Telecommunication Corporation, (KPTC) which was split into Posta, the Communication Commission of Kenya (CCK) and Telkom Kenya in 1999.This was due to poor performance leading to adoption of government economic policies that were supported by the International Monetary Fund (IMF) and World Bank. The policies were to promote efficiency and profitability of PCK through specialization. However, this has not been the case as there is empirical evidence that the firm has continued to decline in its performance. Because the current market environment is so turbulent, firms need to embrace organizational capabilities to enable them overcome the competition they are facing in their business environment for them to remain afloat. These capabilities are the collective skills, abilities and expertise of an organization which is unique and that provides the basis for its strategy and the primary source of its returns. Consequently, the purpose of this study therefore is to establish the effect of organizational capabilities on market performance of the Postal Corporation of Kenya. This study will be guided by the following objectives; to establish the effect of management potential on market performance, to find out the effect of product and service quality capability on market performance and to ascertain the role of technological capability on market performance of the Postal Corporation of Kenya. A descriptive survey design will be utilized. A questionnaire will be used to collect data. Stratified and purposive sampling will be used to sample managers of different sections of PCK. Data will be collected and analyzed both qualitatively and quantitatively by SPSS version 22.Reliability of the research instrument will be done through test and retest method and validity will be done by use of cronbach

Alpha coefficient to ascertain the suitability of the research instruments. Cronbach Alpha coefficient of 0.7 and above will be acceptable in this study. The results will be presented in form of frequency distribution tables, charts and prose. This study may be helpful to the government, NGOs, SMEs, corporates, banks and other policy makers in the country.

Parental Involvement's Influence on Access-Transition Rate from Pre-Primary to Primary Education in Kakamega Central Sub County, Kakamega County, Kenya.

Polycarp waswa and Robert Wafula Wekesa

Abstract.

Parents are the primary and principle educators of their children from infancy to the age they join pre- primary schools. They also remain a major influence on their offspring's education through their formative years, school and beyond. For that reason, their involvement in pre- primary access, learning and transition to primary is very important since it influences the education foundation given to a child for future learning. Despite the fact that Kenya ratified the Jomtien Education for all declaration in March 1990 and Kenya declaring free primary education in 2003, the pre-primary school education access is still at 40% and more worse in Kakamega central which is at 39% (Uwezo Kenya learning assessment 2010). Many reasons just to mention family size, family structure, parent's perception on Early Childhood development and Education, lack of fees and other educational materials and where children live (Ajila & Alutola 2000), have been raised, parental involvement has not been mentioned and given a great weight as a reason. Kenya as a county, a great deal has been achieved in the Early childhood sector through Ministry of Education and other stakeholders, but children enrolling in pre- primary schools have remained low. Parental involvement has not been fully investigated especially in areas related to children's education at pre- primary level. The purpose of this study is to investigate the influence of parental involvement in children accessing ECD education, completion and transition to standard one in Kakamega central sub county, Kakamega County, Kenya. The objectives of the study will include; examine the rate of access to pre-school education, determine ways of parental involvement in pre-school education, establish the rate of transition from pre-school to primary education, compare parental involvement and transition rate and find out factors influencing parental involvement in Kakamega central sub county, Kakamega county Kenya. The Study will be based on both qualitative and quantitative methods of data collection. The data for the study will be obtained from the school records, well administered questionnaires, interviews and observations. Questionnaires will be administered to 45 respondents comprising of pre-school teachers. Interviews will be conducted to 45 Parents of 45 pre-schools which will be purposely selected from 2 divisions of Kakamega central sub county. The data will be analysed using simple percentages and frequency distribution tables to answer the questions that shall be posed by the researcher. The study shall then establish if there is a low access and transition rate of children in Early childhood Education Institutions in Kakamega central sub county due to some highlighted factors on parental involvement.

Analysis of Student Deviant Behaviour Most Prevalent in Schools of Bungoma County

Janet Nabiswa' Dr. Bernard L. Misigo & Dr. Ferdinand N. Makhanu

Abstract

Deviant behaviour in secondary schools continues to be a matter of global concern; more so in developing countries like Kenya. Knowledge of the kinds of deviance being indulged in and the role it plays in particular individuals, groups, schools, communities or sub-cultures is vital for any prevention programme yet this has been missing. Whereas several studies have been done in Bungoma County targeting student indiscipline and specific deviancy like theft, bullying and devil worship, limited studies exist that have purposed to undertake a holistic assessment to enable a fair picture of deviancy prevalence in the schools within the County. The purpose of this study is to address this gap by examining types of deviance and their prevalence in selected secondary schools of Kimilili Sub County, Kenya. Using a sample survey design, data was collected through questionnaires and interview schedules. Data was analyzed descriptively. The study established that all the twelve sampled types of deviant behaviour exist in schools of Kimilili Sub County but in varying intensity or scale of severity. The most prevalent was theft at 21% while the least prevalent was bullying at 3%. The findings give an empirical backing for education sector stakeholders to reengineer their strategies on addressing deviance among students and mitigate the worrying trend of deviant behaviour in schools. The study recommends that while students' rights to self expression besides other rights as envisioned in the United Nations (UN) Convention should be respected, there is need among schools to take cognizance of dynamism of deviance and diversity of norms being driven by modernity and complex societies of the 21st century. This will enable schools to tame intolerable deviance among students.

Key words: *deviance, secondary schools, prevalence, Bungoma County.*

The Effect of Human Capital Development in Health Sector On The Labour Markets of Kenya

Consolata Muyuka Khayinga

Abstract

Organization Considering the scientific, technological, ecological and managerial progress, the exigencies towards supply and demand on the labor market have substantially increased. The specific negotiations of this market focus on the quality, structure and creative capacity of labor resources. The theory of human capital has a large audience at present, being used for the qualitative stimulation of mechanisms on the labor market, meaning that based on it the processes of salary differentiation, migration, searching jobs adequate to the individual's training level and aspirations are explained. The decision to invest in human capital considers the increased requirements towards the labor market demand and supply, being mainly based on a cost benefit analysis, in which costs include both direct and indirect expenses. The main purpose of this study was to find out the effect of Human Capital Development in Health Sector on labour Market of Kenya, it explored and looked into a variety of aspects and the significance of human capital in today's competitive environment in labour market. The paper is an exploratory study, which relied on the analysis of available literature and model testing. The literature review examined published evidence of links between human capital development and labour markets. The literature

established a strong positive association between human capital development and labour markets for individuals, firms and the economy as a whole. It also suggests: that both flows and stocks of human capital are important to productivity; that higher -level skills become increasingly important as countries develop, requiring firms and labour to adopt complex technologies or to innovate to further enhance welfare, that foundation skills play a key role in productivity and are more easily developed during an individual's formative years than in adulthood. Organizations have been persistently emphasizing on human capital by taking necessary measures to develop a culture of knowledge sharing, retain highly competent employees to generate more innovative ideas with a view to achieve the competitive advantage for having an edge over contemporary organizations. An important finding of this research is that both contingency and best practice models can complement each other to create the conditions for effective human capital management.

Keywords: *Human capital, development, Management, Labour Market*

Impact of Inclusive Remedial teaching on performance of pupils with Mathematics Difficulties in Lower Primary Schools in Butere District, Kenya

Wafula Robert Wekesa, Rachel Kamau Kang'ethe & Nyakwara S Becky

Abstract:

Our world now regards being educated so highly making education a human right. Therefore, it is now expected that every child, regardless of their social status, physical or any other disability should access to quality education. Education for All (EFA) and the Millennium Development Goals (MDGs) in education are major international commitments to the achievement of universal primary education for all children and the inclusion of children with SNE in education at all levels. Recent statistics from UNESCO's EFA *Global Monitoring Report* indicate that approximately 27 million children in the Common wealth do not attend school due to special needs education such as those with Mathematical Difficulties. While there are no hard figures to illustrate how many children with Mathematics Disabilities are not in school, studies indicate that 10 -20% of children in a regular class in India have MD and 6-10% in the US. In Kenya 20 – 24% children in regular primary schools have MD. These children struggle a lot in their education, become stigmatized and may drop from schooling if early intervention is not given. Since most of them are in the regular primary schools, effective intervention can be done in the same schools. It was against this background that the UN Secretariat's Education Section adopted the UN Convention on the Rights of People with Disabilities in March 2007 and started the process of compiling lessons from promising practices in the provision of inclusive education, especially for children with disabilities such as MD. The focus was to persuade members Kenya being one of them to implement inclusive education. In this vein, the Kenyan Government conducted a National Survey for Persons with Disabilities in 2008 and found that 4.6% of Kenyans experience some form of disability, comparing favorably to the WHO's estimate of 10% globally. From studies reviewed, children with MD form a population of about 20% of the entire population in the regular primary schools and hence the need to practice inclusive remedial teaching to avoid them becoming stigmatized and excluded from education due to a mixture of fear, shame, and ignorance. To address the marginalization of children with disabilities, and its limiting outcomes, the Kenyan government committed themselves to the provision of inclusive education to all children irrespective of their

gender, age, and the physical and mental ability. Furthermore, it emphasizes inclusive education with particular focus to marginalized groups, especially children with special needs and those with disabilities. However, the extent to which this program (of inclusivity) has made an impact on the ground is still a bone of contention. The purpose of the study: was to examine the effectiveness of inclusive remediation of MD in primary schools in Butere Sub County, Kakamega County. Specifically, the study sought to: assess the impact of Early identification of MD and the Remedial Teaching in a regular primary school (inclusive set up) on the mathematics performance for pupils with MD. Selective factors influencing effectiveness of the inclusive education in the study area were also examined.

Efficacy of Kinesthetic Instructional Resources Utilization on Students' Learning of Biology in Secondary Schools In Bungoma County, Kenya.

Titus Sifuna Munene, Stanley N.Mutsotso, Edwin N.Masibo & Robert N. Nyukuri

Abstract

Instructional resources are meant to build the learning capacity by creating the conditions necessary for teaching and learning. Kinesthetic instructional resources are those that allow students to get physically involved in whatever is being learned, these resources make learning easier and invoke curiosity which is a trigger for learners to carry out different tasks to solve diverse problems and progress in various domains. The purpose of this paper was to investigate the efficacy of Kinesthetic Instructional Resources Utilization on Students' Learning of Biology in Secondary Schools in Bungoma County in Kenya. The objective of this paper was to assess the availability of the varied range of learning materials used in biology in the secondary schools. Research was conducted in Bungoma Central Sub-county, Bungoma County. Descriptive survey design was utilized in this study. Target population was Teachers of Biology, Laboratory Technicians and Form three Students in the secondary schools in Bungoma Central Sub-county. Purposive sampling was used to pick biology teachers and laboratory technicians, while stratified random sampling was used to select schools from which the respondents were picked, students were selected using simple random sampling technique. Data collection was done using questionnaires and document analysis in the schools selected for this paper and analyzed using descriptive statistics. The research found that the teachers of biology have very little influence on the choice of biology at Form two level, the students themselves make a choice to study biology based on the fact that biology is precursor to entry into good careers, the most common available photographs used in the selected schools were black and white photographs which could only be sourced from biology course books and were frequently used by the teachers in the actual classroom instruction. The study also found out that utility of the coloured photographs simplified learning of biology when frequently used. Many teachers of biology, students and laboratory technicians hold the opinion that photographs provide a better alternative to the specimen and that they provide virtual reality of the real specimen. The study established that students learn better when they freely interact with the available photographs. The conclusion made from this paper is that students need constant interaction with the subject teacher of biology to develop the skills needed to answer the questions in biology practical examination, as well as positive attitude and knowledge about the photographs presented to them during practical examinations.

Secondary School Learning and Teaching in the 21st Century: Revolutionizing Education through ICT in Kenya.

Berita Singoro.

Abstract

Information communication technology (ICT) which is the integration of computer technology with data transmission is slowly being integrated in schools for the process of learning and teaching since ICT has a transformative effect on the learning and teaching in schools. It empowers students and teachers to purposefully select activities, applications and mode of communication and engage students in simulations, modeling and creative activities that promote problem- solving of challenging situations that are encountered in the learning and teaching processes. Rapid expansion in technology associated with learning and teaching is one of the most challenging processes in our society where knowledge is expanding rapidly and modern technology are demanding teachers and learners to learn how to use these technologies. This paper therefore seeks to analyze the use of ICT in transforming the learning and teaching processes in secondary school education in Kenya in which ICT integration is aimed at revolutionizing the teaching and learning in schools in order to attain the SDGs of the 21st century of digitizing the education systems. Most secondary schools in Kenya are yet to embrace the use of ICT in the teaching and learning , instead they have limited it to subject level of computer studies for selected few students due to limited resources. To step up the inclusion of ICT in the learning and teaching, the ministry of education should include it in the learning and teaching curriculum, train the teachers in the use of technologies and also supply the ICT infrastructure to schools. This will transform the learning and teachings in schools that will in turn transform education in Kenya.

Key words: *Integration, ICT use, Transformation, learning and teaching and secondary schools.*

Effect Of Peer Teaching Among Students On Their Performance In Mathematics

Elizabeth Akinyi Oloo, Stanley N. Mutsotso, Edwin N. Masibo

Abstract

Mathematics is a key subject in the school curriculum and is considered as critical filter for learners' career choices. However, over the years mathematics has been one of the poorly performed subjects in the Kenya Certificate of Secondary Education (KCSE). In an attempt to improve performance, great effort has been put into use of appropriate teaching and learning methods that stimulate learners' interest in the subject. Recently, a study was done to investigate the influence of peer teaching on performance in mathematics in 12 randomly selected schools in Bungoma South Sub County. The objective of this study was to determine the effect of peer teaching among students on their performance in mathematics in the teaching and learning process. The study was guided by Vygotsky's social interaction theory of learning. This theory opines that social interaction plays a fundamental role in cognitive development and that all learning occurs in a cultural context and involves social interactions where peers assist learners in developing new ideas and skills. The target population was heads of departments, teachers of mathematics and form three students. Twelve heads of department, twenty four mathematics teachers and one

hundred and seventy six form three students were drawn from the sampled schools to participate in the study. A descriptive survey design was adopted for the study. Data was collected using a teachers' questionnaire, students' questionnaire, interview schedule for heads of department and students' achievement test. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 17.0 and Statistical t-test.

Key words: *Peer teaching, performance in mathematics, social interaction theory.*

Factors Influencing Teachers' Perception on The Implementation of Strengthening Mathematics and Science in Secondary Education (Smasse) in Bungoma County, Kenya

Peter Wamalwa

Abstract

The purpose of this study was to investigate factors influencing mathematics and science teachers' perception on implementation of SMASSE programme. The objectives of the study were to; find out the influence of motivational strategies on participation of mathematics and science teachers in the in-service training; assess the influence of trainers' attributes on teachers' participation in the in-service training process and; determine the extent to which the acquired skills during SMASSE in-service training are utilized in the classroom teaching and learning of mathematics and science. The study was guided by Rogers's innovation-implementation diffusion theory which posits that implementation of an innovation depends on the perceived attributes of implementers. The study was carried out in Bungoma County because it has a number of SMASSE INSET centers but performance has been dismal despite participation of mathematics and science teachers in the in-service training. Descriptive survey design was used to cover the sampled respondents in the study area and obtain in-depth information on the status of implementation of SMASSE. The target population was one thousand four hundred and fifty (1450) science and mathematics teachers teaching in two hundred and seventy five (275) secondary schools and nine (9) sub-county Quality Assurance Officers (QASO). Simple random sampling was used to select schools for the study while purposive sampling technique was used to select only those teachers who had participated in SMASSE training. A sample size of four hundred and thirty eight (438) was used. Data was collected using questionnaires, interview schedules and an observation guide. The collected data was analyzed using both descriptive and inferential statistics. From the data collected and analyzed, it was found out that provision of motivation to teachers influence their participation, trainers' attributes enhance teachers' participation and the acquired skills during in-service training highly influence instructional programme during teaching and learning of science and mathematics. It was concluded that classroom implementation of SMASSE programme was influenced by teachers' perception on motivation and trainers' attributes. From the conclusion, it was recommended that the national SMASSE office and the MoEST should consider teachers' views to enhance effective implementation of ASEI-PDSI innovation, the Trainer of Trainers' academic and professional qualifications should be recognized by the MoEST and, the government should employ more teachers to create balance between the teacher-student ratios.

Key words:

Teacher Qualification and Primary School Academic Achievement in Khwisero Sub County, Kenya

Maiyo. J.K, Akharunda S.B & Ndiku. J.K

Abstract

Teachers have a crucial role in improving learning outcomes. Since quality differs by teacher, their potential impact on student outcomes may also differ. This study explored the relationship between teacher qualifications and school academic achievement in Khwisero Sub-County, Kenya. The study was carried out in Khwisero Sub County which had 61 public primary schools. The study utilized an Ex post facto research design since it allowed the researcher to investigate many relationships in a single research project. The target population comprised of all the 670 primary school teachers and head teachers in the 61 public primary schools in Khwisero Sub County. This was a census because the sub county had only 61 primary schools. Five teachers who handled the 2013 class eight candidates in each school were included in the study since there are five examinable subject areas in the Kenya Certificate of Primary Education (KCPE) examination were not directly included. Data was collected through questionnaires which were filled by the Head teachers and also document analysis was carried out on analysed KCPE 2013 results. The instruments validation exercise was done by the supervisors. Reliability of research instruments involved the use of a test-retest technique at $r=0.7$. Data were analysed both descriptively (means, percentages) and inferentially. The findings of the study showed that the P1 teacher, S1/Diploma teacher, Approved Teacher Status and the number of class eight streams were had an effect on the school KCPE means scores. It was recommended that the Teachers Service Commission should check on the rush for degrees by primary school teachers with the hope of better pay as this had a negative impact on the schools KCPE mean score in the Sub-County.

Key words:

An Assessment Of Quality Assurance On Academic Performance In Public Primary Schools In Kenya.

Maiyo J, Ngina J. & Wetiba J.

Abstract

The core function of the directorate of Quality Assurance and Standards is ensuring Quality education. Despite the government's effort in strengthening the department, it is still wanting. The main objective of the study was to carry out an assessment of quality assurance on academic performance in public primary schools in Lugari Sub-county. The study was based on the Structural Functionalist Theory. The research adopted a descriptive research design whereby mixed research methodology was utilized in collecting both qualitative and quantitative data. The study targeted 5 education officials, 45 head teachers, 45 deputy head teachers and 350 teachers all making a target population of 445 people. Stratified sampling technique was used to sample 14 head teachers, 14 deputy head teachers, 105 teachers and purposive sampling technique was used to select education officials all making a sample size of 135 people. Interview schedules were used to collect data from education officials. Questionnaires were used to collect data. Data collected was analyzed using both inferential and descriptive statistics. The study found that QASOs were not visiting schools physically and regularly. It was also found that the QASOs did not have enough time with the teachers to discuss the strengths and weaknesses observed during their visits

to schools. The study found that QASOs did not organize seminars and workshops for teachers on curriculum implementation and at the same time they concentrated on administrative issues whenever they visited schools. The study recommended that QASOs should organize regular seminars and workshops to update teachers on the current teaching methods. There was need to improve the pupils' learning environment by providing enough sanitation facilities, relevant textbooks, enough and secure classrooms.

Key words: *Quality Assurance, Assessment, academic performance*

Early Boarding enrolment and its influence on child-parent bonding in Bungoma South Sub County, Kenya

Margret Wanambisi , Wafula Robert & Dr. Lucy Chikamai

Boarding schools are an intensive form of education, in which students live at school, and visit their families only for weekends and vacations. Cookson et al. (2008) argue that by doing so, parents hope to provide their children a sense of discipline and prepare them for leadership positions. The explicit goal of these boarding schools is to operate a substitution between the two main inputs of the education production function, namely school and home environment, under the presumption that this will generate better outcomes for students. However, very little is known on the effects this substitution actually produces. Also, not much is done in Kenya to establish influence child separation with parents will cause in their bonding. This is because studies indicate that young children and other human beings of all ages are found to be at their happiest and to be able to deploy their talents to best advantage when they are confident that, standing behind them are one or more trusted persons who will come to their aid should difficulties arise. The person trusted provides a secure base from which his (or her) companion can operate. (Bowlby, 1973: 407) Bowlby further argued that many families have not been able to provide an experience of security for their children and will find the positive attachment offered by a therapist a new and possibly daunting experience, for example, 'can I trust this person when I have grown to think I must only ever rely on myself?'. The developmental Attachment theory developmental theory developed by John Bowlby (1969) to offer an understanding of the formation of psychological problems in children and adults revealed that early experiences of separation and emotional deprivation could have long-term negative consequences for children's development. It seems that his interest in this was not simply a 'scientific' one. It was also an attempt to understand his own experience of the separation he had from his parents who sent him away at the age of 7 to boarding school and who generally believed that showing affection to or spending time with their children was unnecessary. In many ways, Bowlby followed Freud in noting that negative events in childhood, such as separation, trauma and abuse, were at the core of later mental health problems—neuroses and pathologies, as they were called. However, Bowlby was interested to develop an understanding of the mechanisms whereby such negative effects could occur, and thus, he turned to a wide range of theoretical perspectives. In effect, attachment 'theory' is best described as an umbrella term for a set of inter-related theories. Central to his thinking was the idea that we possess a fundamental survival instinct to seek protection from our parents (or careers) when we experience dangers. This instinct is shared with other mammals and serves to foster the survival of each species. Therefore, the purpose of this study is to establish prevalence of early boarding enrolment, determinants of early boarding enrolment and its influence on child-parent bonding. The Research Designs to be used will be ex post facto and descriptive survey. The location of the study is

Bungoma south sub county which has well performing public and private schools. The sampling designs will be stratified and purposive to cater for boarding schools. Questionnaires will be administered to head teachers, class teachers and interview schedules for children. Researcher will personally administer questionnaires and interviews. The data will be prepared, coded and analyzed using the PSSS version 20. Findings will be presented by frequency distribution tables, bar graphs and pie charts.

Establish Rules and Regulations, Reasons for Violation and Influence on Aggression in Public Sec Schools Of Butere Sub County Kakamega

Helen A Magoslo and Wafula Robert

Abstract

School rules and regulations are mechanisms designed to control, regulate and manage students' behaviour in schools in order to create conducive learning environment. The purpose of this study was to establish rules and regulations, reasons for violation and influence on aggression in public secondary schools in Butere Sub-County, Kenya. The study was informed by three specific objectives; to identify school rules and regulations that are frequently violated, establish the reasons for violation and influence on students' aggressive behaviours. Study population comprised 3290 students and 319 teachers all from 28 public secondary schools. Descriptive survey research design was used. Stratified sampling was used to categorize the schools into girls' boarding, boys' boarding, girls' day, boys' day and mixed day schools. Purposive sampling was used to select 8 deputy principals and 32 teachers. Simple random sampling was used at school level to select 40 students per school in the 8 selected secondary schools. Based on this criterion a sample size of 360 respondents was accessible for data collection on students' aggressive behaviour. Validity and reliability of instruments were established by experts in the department of education psychology of Maasai Mara University. A pilot study was carried out in four schools different from those where actual study was done. Questionnaires and interview schedules were used to collect quantitative and qualitative data on students' aggressive behaviour. Data generated by questionnaires and interview schedules were analyzed by descriptive statistics using frequency distribution and variable percentages. The findings were presented in graphs and Tables. The findings of the study revealed that students violated school rules and regulations that guard their behaviour and emotions by engaging in aggressive and violent activities such as theft, fighting, quarreling and destruction of school property. The study indicated that age is determinant in students' aggressive behaviour evidenced by high violations in form 2 and 3 where students are at prime adolescent stage. Some school rules and regulations are not clear to the students while others are rigid. This is because students are not involved at formulation stage which makes them to easily violate these rules and regulations. The study equally revealed that disciplinary measures conditioned students to behave in a certain manner without molding their character given the high number of repeated mistakes after punishment. The study recommends that school rules and regulations be reviewed to accommodate age challenges, disciplinary measures such as suspension and replacement of stolen items be repealed and that students be involved at formulation level. The findings of the study inform policy makers about the influence of school rules and regulations on students' aggressive behaviour and the need to restructure them to make them appealing as control and management tools.

Pupils attitude towards G and C and its effect on KCPE perfornce in public schools in Butere Sub county kenya

Judy J Sakwa and Wafula Robert

Abstract

Pupils attitude play a significant role in determining learners keenness, seriousness and consistency in seeking guidance and counseling services. The negative mean deviation in KCPE results in Butere Sub County has not been impressive for the last five years. The purpose of this study was to establish pupils' attitude towards guidance and counseling and its effects on performance in KCPE in public primary schools in Butere Sub- County, Kenya. The study was informed by three objectives; to identify determinants of pupil's attitudes towards guidance and counseling and its effects on performance, to establish pupils' attitudes towards guidance and counseling and to investigate ways of enhancing pupils' attitudes towards guidance and counseling in public primary schools. Descriptive survey research design was used. Location of the study was in Butere sub-county, Kakamega County. The study population comprised of 75 head teachers, 75 guidance and counseling teachers and 2738 class eight pupils in all public primary schools in Butere Sub County. The study targeted all public primary schools in Butere Sub County. Simple random sampling was used to select 821 class eight pupils who had the ability to read and express their feelings. Purposive sampling was used to select 23 head teachers, 23 guidance and counseling teachers. The validity and reliability of the instruments were enhanced through pilot study and also through experts' validation by supervisors in the department of Education psychology. Questionnaires were used to collect qualitative and quantitative data on pupils' attitudes towards guidance and counseling. Data generated by questionnaires were analyzed by descriptive statistics using frequency distribution and valuable percentages. Qualitative data was transcribed and organized into themes, categories and sub categories as they emerged in the study. Presentation of data was through tables, pie charts and histograms. The findings of the study indicated that pupils' attitude towards guidance and counseling affect academic performance (Positively or negatively). Based on the findings, it was recommended that: The ministry of Education and youth Affairs should fund guidance and counseling programs in primary schools to cater for seminars, training of teachers and in-service courses. The results of the study may assist pupils' in making informed choices regarding academic performance; Help head teachers to assess, manage and implement guidance and counseling programs in their respective schools.

Binary Codes from AutL3(4)

Lucy Chikamai

Abstract

Codes are used to correct errors caused during transmission of data. Codes are constructed from various mathematical objects including incident matrices of graphs, designs and other

combinatorial objects. Recently, codes obtained from finite simple groups have attracted a lot of attention from researchers. The interplay between codes and these mathematical objects have helped solve some hitherto unsolved problems. In this paper, binary codes obtained from the primitive permutation representation of degree 105 from the group $\text{AutL3}(4)$ are constructed and studied.

Key words:

On Joint Essential Spectrum of Aluthge Transform

Cyprian Omukhwaya Sakwa

Abstract

Aluthge introduced the concept of Aluthge transform \tilde{T} of an operator T on Hilbert space in 1990 in his study of p -hyponormal operators. Properties of the transform have since been investigated by several authors. Some elementary spectral and numerical range properties and related results of Aluthge transform have been obtained. For instance, Yuan Wu proved that the closure of the numerical range of Aluthge transform of the operator T is contained in that of T in 2002. In 2007, Guoxing Ji, Ni Liu and Ze Li together showed that the essential numerical range of Aluthge transform is contained in the essential numerical range of T . However, the properties of the Aluthge transform have not been exhaustively studied. For instance, the joint essential spectrum of Aluthge transform has not been studied. This paper will therefore introduce and study the joint essential spectrum of \tilde{T} and establish its properties. In particular, the study shows that the joint essential spectrum of $e \tilde{T}$ coincides with the joint essential spectrum of an m -tuple of operators $T = T_1; \dots; T_m$. We also show in this paper that the joint essential spectrum of \tilde{T} is contained in the joint essential numerical range of \tilde{T} . The results of this study will be helpful in the development of the research on numerical ranges and may also be applied by mathematicians in solving several problems in operator theory.

Quantum Thermodynamics of a Strongly Interacting Bose-Fermi Mixture in a Three-Dimensional Anharmonic Potential

Oliver Wanyama Mumali, Kibabii University,

Abstract

An idealized quantum system is a Harmonic oscillator that obeys Hooke's law. Anharmonic oscillation is a deviation of a system from harmonic oscillation. Bosons are integer spin particles which are governed by Bose-Einstein statistics while fermions are half-integer spin particles governed by Fermi-Dirac statistics. The main objective of the study was to determine thermodynamic properties of a binary mixture of strongly interacting bosons and fermions in a three dimensional anharmonic potential. Objectives of the study are: to determine the internal energy, determine heat capacity at constant volume and determine entropy of a perturbed grand canonical system of ^3He - ^4He isotopes. Thermodynamic properties of Bose-Fermi mixture at ultra-low temperatures were studied using perturbation theory in three Cartesian coordinates. The total Hamiltonian for the system was developed in terms of pair interactions. The harmonic oscillator problem was solved from the Hermite equation. MathCAD Professional 200 software

was used to generate values and graphs of the variables against temperature. The total internal energy of the binary system was found to increase with increase in temperature. In both first and second excited states the mixture had about 150 joules of energy at about 40 kelvins. Energy value of the mixture in the ground state was found to be about 171.3 joules. The specific heat capacity versus temperature curves showed sharp turning points with different peak values at different temperatures. Entropy of the BF mixture in an excited state was found to increase with temperature, and became constant at higher temperatures but became zero at temperatures near absolute zero. An extra second order correction applied to a quartic perturbation lowers the internal energy of a boson-fermion mixture in an excited state. Perturbation lowers entropy of an excited system. Peak value of specific heat capacity for a higher excited state is lower while transition temperature is higher.

Key words: *Bose-Fermi, Anharmonicity, Perturbation, Grand-canonical, Hamiltonian*

Characterization of Hilbert Space Operators and Their Applications

N. B. Okelo

Abstract

The study of operators forms a very important aspect in functional analysis. In this, paper we present positivity and norms of operators in Hilbert spaces. We outline the theory of normal, self-adjoint and norm-attainable operators. We give results on norms of normal, norm-attainable and self-adjoint operators. We also consider numerical radius attainability of these operators. Lastly we explore their applications to forensics and ICT. We illustrate how useful these operators are to image processing which is fundamental in enhancement of security and forensic procedures.

Keywords: *Hilbert space, normality, norm-attainability, self-adjoint operators*

On Joint Essential Maximal Numerical Range of Aluthge Transform

Cyprian Omukhwaya Sakwa

Abstract

Let $T = UT$ be any polar decomposition of an operator T with U a partial isometry. The Aluthge transform $\tilde{T} = |T|^{\frac{1}{2}} U |T|^{\frac{1}{2}}$ was first introduced by A. Aluthge in 1990 in his study of p -hyponormal operators. Properties of the transform have since been investigated by several authors. Some elementary spectral and numerical range properties and related results of Aluthge transform have been obtained. For instance, in 2002, Yuan Wu proved that the closure of the numerical range of Aluthge transform of the operator T is contained in that of T . In 2007, Guoxing Ji, Ni Liu and Ze Li together showed that the essential numerical range of Aluthge transform is contained in the essential numerical range of T : However, the properties of Aluthge transform have not been exhaustively studied. For instance, the joint essential maximal numerical range of Aluthge transform has not been studied. This paper will therefore introduce and study the joint essential maximal numerical range of \tilde{T} and establish its properties. In particular, this paper shows that the joint essential maximal numerical range of \tilde{T} is contained in the joint essential maximal numerical range of an m -tuple operator $T = T_1; \dots; T_m$: Further, we introduce and study the notion of the

joint maximal numerical range of \tilde{T} . The results of this study will be helpful in the development of the research on numerical ranges and may also be applied by mathematicians in solving several problems in operator theory.

Nonparametric Estimation of Non-Smooth Functional

Moses Kololi Mukhwana

Abstract

In statistical inference, one of the basic problem is that of estimating functionals. This problem is considered in the nonparametric set-up. The quality of estimation depends on smoothness properties of the functional F . However, a non-smooth functional lack some degree of properties traditionally relied upon in estimation. Lack of these traditional properties highlights the reason why standard techniques fail to give sharp results. In estimating non-smooth functional, the lower and upper bounds are constructed for the MiniMax Risk. When working in the context of MiniMax estimation, the lower bounds are important. A single-value MiniMax lower bound is established by applying the general lower bound technique based on testing two composite hypotheses. A vital step is the construction of two special priors and bounding the chi-square distance between two normal mixtures. An estimator is constructed using approximation theory and Hermite polynomials and is shown to be asymptotically sharp MiniMax when the means are bounded by a given value.

Key Words: *Non-Smooth Functional, Nonparametric, Minimax*

On Joint Essential Numerical Range of Aluthge Transform

Cyprian Omukhwaya Sakwa

Abstract

The concept of Aluthge transform was first introduced by A. Aluthge in 1990 in his study of p -hyponormal operators. Properties of the transform have since been investigated by several authors. Some elementary spectral and numerical range properties and related results of Aluthge transform have been obtained. For instance, in 2002, Yuan Wu proved that the closure of the numerical range of Aluthge transform of the operator T is contained in that of T . In 2007, Guoxing Ji, Ni Liu and Ze Li together showed that the essential numerical range of Aluthge transform is contained in the essential numerical range of T . However, the properties of the Aluthge transform have not been exhaustively studied. For instance, the joint essential numerical range of the Aluthge transform has not been studied. This paper will therefore introduce and study the joint essential numerical range of Aluthge transform and establish its properties. In particular, this paper shows that the joint essential numerical range of the Aluthge transform is contained in the joint essential numerical range of an m -tuple operator $T = T_1, \dots, T_m$. The results of this study will be helpful in the development of the research on numerical ranges and may also be applied by mathematicians in solving several problems in operator theory.

On Completely Bounded Maps

Abstract

Completely bounded maps theory is an important field due to its significance, application and mathematics itself. Properties of maps such as continuity, contractivity, positivity and boundedness have been discussed with good results by Mathematicians. However, other properties such as complete boundedness and complete positivity have not been exhaustively discussed by researchers. In this paper, we have investigated complete positivity of a map. Given a C^* -algebra A and other generated C^* -algebras on A , we have investigated these forms of C^* -algebras and constructed maps between these C^* -algebras under certain conditions and investigated conditions under which they are completely bounded. Examples of completely bounded maps have been given. A map is completely bounded if its completely bounded norm is finite. We have also discussed whether this completely bounded norm is indeed a norm. The results of this study will pave way for further introduction of C^* -algebras from the known ones, which will be helpful in the development of the research on completely bounded maps on these generated C^* -algebras and may also be applied by mathematicians in solving several problems in algebra.

Keywords: *norm, completely bounded norm and completely bounded maps.*

Global Controllability of a Quasi-Linear Heat Equation with Boundary Conditions

Mulambula Andanje

Abstract

In this work, we study the global controllability of the quasi-linear heat equation with boundary conditions. We consider distributed controls with support in a small sub-domain. We assume that the quasi-linear terms are locally Lipschitz. We prove that there exists a control that drives to desired state within a finite time.

Key words: *Quasi-linear heat equation, Lipschitz continuity, global controllability*

Disorder as a Source of Pseudogap in Cuprate High Temperature Superconductors

Jared Oloo Odhiambo

Abstract

For over thirty years the mechanism that explains the working of high temperature superconductors (HTS) has been a mirage. Numerous researches to explain this phenomenon from experimental

and theoretical point of view has witnessed contradictory results in addition to lack of repetition of the same results when the experiments are repeated with the initial conditions. So far there are basic agreed on properties of cuprate HTS i.e.: Physically cuprate HTS materials are made of bulk perovskite crystals, the critical temperature of most cuprate HTS is above 35 K, most cuprate superconductors possess d-wave symmetry rather than s-wave possessed by conventional superconductors. Pseudogap has been fronted as the harbinger to explain conduction mechanism in cuprate HTS. Pseudogap arises due to interaction between electrons. In this case using second quantization mechanism of an interaction between cooper pair and an electron we were able to note that upper pseudogap temperature (T^*) is related to critical temperature (T_C) in that $T^*/T_C = 1.11$ (truncated) when relating entropy to temperature

Key words:

Norms of Elementary operators.

Beatrice Adhiambo Odera

Abstract

Our main result concern the operator $T_{a,b} : B(H) \rightarrow B(H)$ defined by $T_{a,b}(x) = axb + bxa$ for all $x \in H$ and a, b fixed in $B(H)$. No formula is known for computing the norm $T_{a,b}$. Clearly, $\|T_{a,b/B(H)}\| \leq 2\|a\|\|b\|$. But the largest possible c such that $\|T_{a,b/B(B)}\| \geq c\|a\|\|b\|$ for all $a, b \in B(H)$ and $c \in \mathbb{R}$. In this paper, we determine the norm of a two-sided symmetric operator in an algebra. More precisely, we investigate the lower bound of the operator using the injective tensor norm. Further, we determine the norm of the inner derivation on irreducible C^* - algebra and confirm Stamfli's result for these algebras that $\|T_{a,b}\| \geq 2\|a\|\|b\|$. *Mathematics Subject Classification:* Primary 46L57; Secondary 47A30, 47A80

Keywords— *Bounded Operators, Derivation, Two sided symmetrised Operator, Algebra*

On Joint Numerical Range of Aluthge Transform

Cyprian Omukhwaya Sakwa

Abstract

The Aluthge transform $e \tilde{T}$ of an operator T on a Hilbert space was first introduced by A. Aluthge in 1990 in his study of p -hyponormal operators. Properties of the transform have since been investigated by several authors. Some elementary spectral and numerical range properties and related results of Aluthge transform have been obtained. In 2002, for instance, Yuan Wu proved that the closure of the numerical range of Aluthge transform of the operator T is contained in that of T . In 2007, Guoxing Ji, Ni Liu and Ze Li together showed that the essential numerical range of Aluthge transform is contained in the essential numerical range of T : However, the properties of the transform have not been exhaustively studied. For instance, the joint numerical range of the Aluthge transform has not been studied. This paper will therefore introduce and study the joint numerical range of \tilde{T} and establish its properties. In particular, this paper shows that the joint numerical range of \tilde{T} is contained in the joint numerical range of an m -tuple operator $T = T_1; \dots; T_m$: The results of this study will be helpful in the development of the research on numerical ranges and may also be applied by mathematicians in solving several problems in operator theory.

Innovative Phone Features Driving Mobile Phone Usage by Students

Richard K. Ronoh, Samuel Mbugua, Franklin Wabwoba

Abstract

Mobile phone adoption and usage enjoyed drastic and exponential success as far as the history of technology adoption goes. However, there are indications that users are becoming frustrated by the unconstrained addition of features and services to the mobile phone guided by the assumption that “more is better”. Currently, mobile phone features present a range of innovations that are rarely useful to majority of users. The result is that many mobile phone features are never used and yet these features significantly contribute to power consumption and cost of the mobile phone. This study investigated innovative phone features that drive mobile phone usage patterns amongst university students in Kenya. In this descriptive analytical study 310 students were selected. Data was collected using a researcher-administered questionnaire and was analyzed using principal component analysis. An average of 24% of respondents indicated that they used most of the features provided by their mobile phones. The usage of some phone features was significantly different between male and female students. Provision of appropriate educational programs about beneficial use of mobile phone is quite crucial.

Keywords

Mobile phone features, students, technology, innovation

Application Lifecycle Management Activities and Tool Integration for Quality Assurance in Software Development

Tobias O. Otibine, Samuel Mbuguah & Juma Kilwake

Abstract

Lifecycle Management approaches promise more systematic and efficient ways to support the development and management of complex products. The concept of Application Lifecycle Management (ALM) indicates the coordination of activities and the management of artifacts during the software (SW) product's lifecycle. Most of the currently available unified ALM solutions are either based on basic version control and other 'low level' point-to-point integrations, or advocate the adoption of a new and expensive all-in-one solution from a single vendor. The problem with these current solutions is that the first does not go far enough to really provide the previously described benefits of applying an ALM solution, while the second one is often associated with high costs in tools, infrastructure and personnel. Thus the purpose of the research was to develop an ALM framework. The objectives were: to establish the Application Lifecycle Management activities involved in software development, to determine the level of integration of the Application Lifecycle Management tools in providing Application Lifecycle Management solutions and to develop an Application Lifecycle Management framework for quality assurance in software development. The research employed case study design. The target population for the study was the various users involved with ALM activities in software development industries consisting of 200 respondents and included 6 homogeneous stratum comprising of 10 Managers, 60 Developers, 60 Testers, 30 Analysts, 20 Directors and 20 Architects. The data collection tools included Questionnaire, Observation and Interviews. In order to test the validity and reliability of the instruments, first the questionnaires were scrutinized and approved by the university supervisor and a group of experts before issuing them. Then a test-retest of the instruments was done by piloting in two companies which were not part of the study and the internal consistence of data

from the questionnaire's computed by using the Cronbach's Alpha coefficient which resulted to a coefficient of 0.808. Data analysis was done using descriptive and inferential analysis. The output of the research is an ALM framework which would enable deep semantic integration between different ALM activities and tools while still considering the business interests of organizations.

Keywords: Application lifecycle management, SDLC, ALM, Software development, tool integration, software

Information Security Risks Posed by the Bluetooth Security Weaknesses to the Bluetooth-Enabled Phones

Chrispus Kimingichi Wanjala, Samuel Mungai Mbugua, Juma Kilwake

Abstract

As the widespread use and acceptance of Bluetooth technology increases, concerns are being raised related to security vulnerabilities of this technology. Inadequate device resources and lack of user awareness has compounded this issue where the emphasis on design constraints, functionality and ease of use sometimes outweigh security concerns. The research determines vulnerability of Bluetooth security and the security risks these vulnerabilities poses to the users' information stored in Bluetooth-enabled phones. The research design was based on multi-case study where two cases were selected. Questionnaires and interview were used in data collection. Both qualitative and quantitative approaches were used in data analysis. Descriptive statistical method was used for data analysis. The key findings from the study were that to improve security of information stored in Bluetooth-enabled phones, application layer security should be employed to provide additional security measures not provided in the current authentication and authorization process. Secondly the E0 encryption algorithm currently used for encryption is too weak and therefore the DES and AES algorithm should be used due to their efficiency and reliability. Lastly it was found out that most users have no knowledge on how to configure these devices thus manufactures of these devices should provide users with user documentation that explains the use and device configurations.

Keywords: *Bluetooth security, bluetooth technology, bluetooth-enabled phones*

Evaluating the Performance of Selected Commercial Bio-Fertilizers on Soybean Production in Bungoma, Kenya

Collins .O.Majengo; J. R.Okalebo; W. Ng'etich ; S.Mutua ; E. Mutegei. And M.W Mburu

Abstract

The study was conducted to compare the performance of promising commercial bio-fertilizers that have been evaluated under the green-house conditions at TSBF-CIAT, in farmers' conditions through the use of promiscuous soybean variety (SB19). The trials were laid out on small scale farms in Bungoma County, situated in Western Kenya. The experiment was established in March 2010 during the long rains (LR) and repeated during the short rains (SR) of 2010; laid out in multi-locational one farmer field one replicate design. Treatments were not replicated within each field. During LR 2010, 50 farms were researched on and 100 farms in the second season (SR 2010). A promiscuous medium-maturity soybean variety TGx1740-2E (SB 19) was inoculated with

Legumefix (Rhizobia) or/and Rhizatech (mycorrhizae) inoculants. The mycorrhizae inoculum was applied to the soil in the seed furrows at the recommended rate of 30 kg ha⁻¹. Nodulation was examined at mid-podding (50% podding) by carefully uprooting all plants with their entire root system from a 1 m² section in each plot. Nodules were counted and weighed; the root and shoot parts separated, and fresh and dry weights assessed. Analysis of variance was conducted to determine the effects of (and interactions between) the two inoculants on plant parameters using a mixed linear model (MIXED procedure, SAS). Rhizobial inoculation resulted in significantly ($p < 0.01$) higher nodule biomass (0.93 g plant⁻¹) compared to the control (0.27 g plant⁻¹) across many farms. Mycorrhizal inoculation had no significant effect on nodulation when applied solely (0.38 g plant⁻¹), but co-inoculation of Rhizobia and mycorrhizae increased nodule biomass further by 0.09 g plant⁻¹. There was a significant difference ($p < 0.01$) in terms of biomass yield between treatments. Rhizobial inoculated plants had the highest biomass production of 2086 kg/ha. Rhizobial inoculation resulted in higher grain yields of 1116 kg/ha above the control. Soybean inoculation increased both nitrogen and phosphorus uptake in the biomass. Rhizobial inoculant had the highest soybean N uptake of 48.6 N kg/ha which was significantly different ($p < 0.05$) from control and sole application of mycorrhizae. Statistical analysis showed that soil factors (pH, P, C, N) significantly ($p < 0.001$) affected soybean grain yields during both seasons. It is concluded from this study that rhizobial inoculants have a high potential as commercial bio-fertilizers and can substitute the need for mineral N fertilizer in the legume farming systems. However, there is need to target these inputs to the most responsive fields. Further studies are needed to elucidate the conditions under which synergism between both inoculants may occur, with specific focus towards soil P availability and management of P inputs.

Keywords: *Soybean, Rhizatech, Legumefix, Inoculant, Grain Yield.*

Reconsideration of forests tree species composition to incorporate indigenous fruit/food trees species

A.K Walingo and L. Chikamai

Abstract

The current forest policies and management practices have failed to address the issue of food contribution towards communities that live within and with-out the forest. This is seen in the current tree composition of most forests in the world, where emphasis is centred mostly on wood= timber benefits and climate mitigation. This paper looks at the initial co-existence of communities where food security, especially for children and adults, in Africa were addressed. Examples are: the Ongieks, Sangwets in Kenya, Pygmies in Congo among others who lived and fed in the forest non-destructively. The present Ongieks, Sangwets and Pygmies of our times can be likened to street children, unemployed youth, squatters and many landless people, who faced with same challenges are posing danger to the environment and economic stability of Nations and in particular Africa. Just like the one third gender rule, we propose that management legislature, in Kenya, be made to ensure that forest composition is all inclusive.

Key Words:

Potential of Lubricating Oil (MGALO) and organic Bio-fertilizer production from Marine Green Algae

Bonface Jiveri, Adhiambo Brendah Diana Kwanyi, Musyimi David and Sylvester Anami

Abstract

Green seaweed *Euchuma rhodophyta*, *Ulva lactuca* and *Enteromorpha flexuosa* harvested from the Indian Ocean (Kenya) were characterized as feedstock for the production of lubricating oil and bio-fertilizer. *Euchuma rhodophyta* had the highest oil yields of 10.5% (g/g) followed by *Ulva lactuca* with 6.3% (g/g) and *Enteromorpha flexuosa* with 3% (g/g) from 100 g of algal biomass respectively. The average kinematic viscosity from all the three algae was 32 cst at 40°C suggesting a potential industrial application of the oils as lubricating base stock. Oil from the three marine algae had similar densities of 0.9132, 0.9136 and 0.9151 kg/L at 20°C though the oils were denser than the stipulated range of **Shell Tellus** Lubricating oils ranging between 0.8850kg/L-0.870kg/L. After oil extraction, the biomass was further converted into bio-fertilizer containing 10% potassium which is absent from many commercial fertilizers and rich in nitrogen (10%) and phosphorus (8%). We conclude that the three marine algae are potential source of bio-energy and bio-fertilizer and that industrial processing of the algae will be of significant economic and environmental advantage.

Key words: *Algae, Bio-fertilizer, Lubricating oil, Marine.*

Taboo and Secular Education: The Engagement towards Environmental Conservation in Africa.

Ochieng Ahaya and Risper Wepukhulu

Abstract

The paper presupposes that the secular conception inherent in western science as part of the general colonial baggage to Africa, has presented a clash of worldviews for Africa; Western versus African, and in essence a form of civilizational clash. The resultant encounter has not largely integrated, but instead, through a secular lens, partly ignored African ways, and partly displaced the African structures. One particular area where this ignorance gained currency was in the colonial, and post colonial educational policies in general, and the environmental conservation policies in particular. While attributing the environmental woes in Africa to this ignorance and displacement of traditional structures, this study upholds the potential role of traditional African educational strategy for children in its employment of taboos towards environmental conservation. The paper examines the renewed interest on traditional African taboos from a general conceptual framework of hypothetical consonance and its relevance in the treatment of the relationship between religion and Western science today. This approach discourages the dogmatism from both the theologian, and the Western scientist hence has the potential for a more fruitful interaction. The expected result of the engagement should be a unique educational phenomenon which is functional in the African context; “a western scientific education laced with the superstition of the traditional African life.”

Gender Mainstreaming in Climate Change Adaptation: A case of Bungoma County of Western Kenya

Ekisa George., Chikamai Lucy., Juma Shem.

Abstract

This research examines climate change Adaptation activities over Bungoma County. Gender involvement in activities geared towards enhancing resilience to climate risks is investigated. Systematic sampling of cross sectional data representing 100 households was done over the area of study. Preliminary results of the analysis indicate a gender biased strategy to enhance climate change adaptation. It is expected that at the end of this research, gender gaps in climate change adaptation activities will be identified and addressed over the area of study.

Key word:

Future Temperature and Rainfall Projections Over Bungoma County in western Kenya

Juma Shem G., Kwach Boniface., Omukoba Mulati., Festus Kelonye

Abstract

Using the PRECIS regional climate modeling system, this study projects extreme temperature and precipitation over Bungoma County in recent past (2001–2014) and in a future (2015–2050) climate under the IPCC SRES A2 and B2 emissions scenarios. Spatial-temporal analysis of future climate extremes will be done over Bungoma County. Relevant test of significance will be determined to shed light on whether any possible changes in future climate are statistically significant. It is expected that results of analysis will show simulations of temporal distribution of extreme temperature and rainfall events when compared with observations; over the area of study.

Key words:

Key Value Chain Actors in the Dairy Sector in Bungoma County, Kenya

Nabiswa Patrick Koyi, Jacob W. Wakhungu and Donald N. Siamba

Abstract

Food security is the first of the eight Millennium Development Goals (MDGs), which sought to eradicate extreme poverty and hunger by the year 2015, and second of the recently United Nations General Assembly (UNGA) adopted 17 global Sustainable Development Goals (SDGs) that are aimed at finishing the job of the MDGs, and bring everyone on board the Sustainable development vehicle. The study investigated the key value chain actors in the dairy sector in Bungoma County. This study was anchored on Porter's Value Chain theory. The study adopted cross-sectional research design. Target population consisted of thirteen (13) Dairy Cooperative Societies with a total membership of 10,062 livestock farmers, eight (8) Livestock Officers from the eight (8) sub-counties and thirteen (13) managers of Dairy Cooperative Societies and other licensed milk vendors. The study used semi-structured questionnaires, key informant interview schedules, focus group discussion and observation schedules to collect primary data. A Pilot study was carried out using one (1) Managers of the Dairy Cooperative Society, 12 Livestock Farmers, three (3) Cooperative Officers and four (4) Livestock Officers from Kimilili Sub-County and then data analyzed using Cronbach alpha method which yielded an alpha value of 0.824. Validity of research

instruments was tested using content, construct and face validity. The data obtained was analyzed using descriptive and inferential statistics and presented in frequency tables, pie charts and bar graphs. The study found out the key value chain actors in the dairy value chain in Bungoma County to include the livestock farmers, livestock officers, managers of dairy cooperative societies, veterinary officers, public health officers, licensed milk vendors, dairy farmers, product consumers, county trade and industry officials, banks, microfinance institutions and insurance companies, transporters, NGOs, dairy input suppliers, quality standards officers (KEBS), Kenya Dairy Board and animal feed producers among others. Each of these actors play a very integral role in the dairy value chain, though their varied capacities to fully transform the dairy value chain were found inadequate. It was concluded that transformation of the dairy value chain for food security and sustainable development in Bungoma County was not possible without these key plays. It was recommended that for the key players to be effective and efficient in their operations there was need to develop and implement relevant policies towards transformation of the dairy value chain for food security and sustainable development in Bungoma County. These findings will be vital to the Ministry of Agriculture, Livestock, Fisheries and Cooperatives, and other policy makers in enforcing measures for achieving food security in Bungoma County, Kenya and Africa as a whole, and creation of new knowledge in transformation of the dairy value chain for sustainable development.

B212: Determination of Selected Heavy Metals in Two commercial Cigarettes brands and Tobacco Leaves Marketed in Emuhaya District, Western Kenya

Joseck olukusi Alwala,

Abstract

Two commonly smoked brands of cigarette and tobacco leaves from Emuhaya District, western Kenya were randomly sampled and analyzed for heavy metals using Atomic Adsorption Spectrometry (AAS). The brands were Sportsman and Embassy. The results of the analysis indicated that the concentration of Zn was found to be in the range of 2.33 ± 0.36 - 2.58 ± 0.47 ppm, Cu had 15.4 ± 0.77 - 19.4 ± 0.21 ppm and Cd was 0.08 ± 0.02 - 0.10 ± 0.03 ppm. Pb was found in the range of 6.76 ± 0.62 - 7.09 ± 0.07 ppm, Mn concentrations were in the range of 67.32 ± 0.50 - 96.23 ± 0.30 ppm and the values for Fe were in the range of 155.40 ± 0.13 - 260.80 ± 0.21 ppm while Cr was in the range of 2.09 ± 1.84 - 3.62 ± 1.50 ppm. Iron concentrations were highest in all the cigarret brands and tobacco leaf compared to the other metals. The concentration of cadmium was lowest in all the samples analyzed. ($P < 0.05$). The levels of heavy metals were above the WHO permissible limit in all the brands and tobacco leaf except for Zinc. The results indicate the prevalence of heavy metals toxicity potential of each brand of cigarette and tobacco leaf and emphasizes on the dangers of cigarette smoking. They also provide scientific rationale for exploitation of these brands of cigarettes and tobacco leaf by the local communities and may lay down some groundwork for serious analysis of heavy metals by manufacturing companies. However, smoking is dangerous and caution needs to be taken for their conflicting adverse medical-based and physiological effects.

Keywords: Tobacco, heavy metals, Cigarette, Toxicity

Antimicrobial activity of *Persea Americana* leave extract against *staphilacoccus mutans* from Emuhaya, Western Kenya.

Alwala, Joseck Olukusi

Abstract

Hexane, ethyl acetate, and methanol extracts of *Persea Americana* leave were tested against the dental caries causing bacteria *Streptococcus mutans* from caries infected patients. Bioactivity of the concentrations of 0%, 5%, 10%, 15%, and 20% of all the extracts showed an increasing ($P \leq 0.05$) activity. The concentrations of 20% in all solvents' plant extracts showed the highest bioactivity. The bioactivity strength against *Streptococcus mutans* of the three solvents' plant extracts showed no significant differences ($P \leq 0.05$) among each other and had a comparable antibacterial activity to that of chlorhexidine.

Key words; *Persea Americana*, Antimicrobial activity, *Streptococcus mutans*, chlorhexidine

Potential Environmental Impact of Chemical and Microbial Characteristics of Sewage for Energy Production in Secondary Schools of Kakamega County, Kenya

Ibrahim O. Barasa, Jacob W. Wakhungu And Donald N. Siamba

Abstract

It is strongly believed that secondary schools can generate energy from sewage to supplement biomass energy thereby protecting the environment. However, potential beneficiaries are sceptical about environmental health risks posed by sewage due to its characteristics. This study assessed the potential environmental impact of the chemical and microbial characteristics of sewage for energy production in secondary schools of Kakamega County, Kenya. Sewage influents and effluents samples were collected in specimen bottles and analysed in the laboratories for TKN, P_2O_5 , heavy metals and *E.coli* and faecal coliforms. It was established that the chemical characteristics in the sewage generated are: TKN 8.30 mg/l with SE of 0.45; pH 5.75 with SE of 0.13; P_2O_5 1.15mg/l with SE of 0.46; Cd 0.0249 mg/l; Pb 0.0046 mg/l; DM 13.80% with SE of 0.66. The microbial characteristics in the sewage generated are: *E.coli* 390 MPN/100mls and faecal coliforms 450 MPN/100 mls. The anaerobically digested effluent increased its concentration of TKN and P_2O_5 by 8.2% and 1.7% respectively. Its pH also increased by 26.1%. However, the DM, *E.coli* and faecal coliforms reduced by 61.8%, 74.4% and 88.89% respectively. The traceable quantities of heavy metals remained unchanged in the effluent after the AD process. The microbial characteristics of the sewage generated in secondary schools have a negative impact on the environment by causing pollution of the soils and water. Environmentally, AD of sewage for energy generation reduces the *E.coli* and faecal coliforms concentrations in the effluent to harmless trace levels. The decrease in DM means that less space will be required hence reduced rate of refilling. It also means that some biological process is going on and this is environmentally beneficial as evidenced by the decrease in *E.coli* and faecal coliforms. The increase in P_2O_5 and TKN as well as the pH will benefit the soils as bionutrients. Generally, use of sewage bioenergy will help reduce the effect of methane on the biosphere.

Keywords: Anaerobic digestion, environmental protection, microbial characteristics, chemical characteristics, sewage.

The Healthy Beans Project: Participatory Research in Western Kenya

*Janice Thies, Dries Roobroeck, Samuel Were, Luiza Munyua, James Agwa, Jean Bonhotol,
Bethany Boyer-Rechlin*

Engaging in participatory research, moving the work of knowledge generation out of the laboratory and into the hands of farmers, is an important way that those involved in agricultural research can contribute to the goal of societal empowerment. This presentation will introduce The Healthy Bean Project, an agricultural research project managed by Cornell University, the University of Nairobi, and the International Institute for Tropical Agriculture (IITA) and funded by the United States National Institute of Food and Agriculture (NIFA)'s Feed the Future program. The goals of the project are to decrease incidences of soil-borne diseases, increase yields, and improve soil health in bean-farming systems. The project also has an extension/capacity-building focus, with a 4th stated goal being to “build capacity by training participants on how to prepare compost, how to use farm-scale, biochar producing stoves and how to use the resulting biochar and compost to improve soil condition, increase nodulation and N fixation and suppress plant diseases.” This presentation will introduce the Healthy Beans Project's research methodology, share some preliminary results from the first years of field trials, and provide insights on the strengths and challenges inherent in participatory research and the contribution such research makes to the broader goals of societal empowerment.

Projected Rainfall and Temperature Changes Over Bungoma County in Western Kenya by the Year 2050 Based on PRECIS Modeling System

Juma Shem G, Kwach Boniface., Omukoba Mulati., Festus Kelonye Magero Vincent

Abstract

This study investigated projected changes in Rainfall and temperature over Bungoma County by the year 2050 based on the Intergovernmental Panel on Climate Change (IPCC) Special Report on Emission Scenarios (SRES) A1B AND A2B emission Scenarios using the Providing Regional Climates for Impacts Studies (PRECIS). The PRECIS regional Climate Model (Hadley RM3P) was configured in $0.22^{\circ} \times 0.22^{\circ}$ horizontal grid resolution was forced at the lateral boundaries by the UKMO-HadAM3P and UKMOHadCM3Q0 global Models. The future projection of temperature indicates warming over Bungoma County by the year 2050 coupled with reduced precipitation. Time series analysis revealed a cyclic and seasonal trend in rainfall and temperature over the area of study. Temporal characteristics revealed a warmer and colder September-October-November (SON) season under A1B and A2B scenarios respectively. The results also revealed increasing temperatures and reducing rainfall across all seasons under both scenarios except in March-April-May (MAM) season where rainfall amounts increased and temperature reduced. A two paired t-test for the two climate variables revealed a p value of less than 0.05 ($p < 0.05$) suggesting a statistically significant relationship between each pair of the two variables. The study recommends further evaluation of the model performance in simulating the present day climate.

Key Words: *Climate Change, General Circulation Model, Regional Circulation Model, PRECIS, Bungoma County*

Estimation of weight of infants at birth based on the mother's pre-natal information.

Dr. Richard Donkor.

Abstract

Background: Risk factors in mothers that may contribute to low birth weights or overweight of babies at birth are nutritional (uterine malnutrition produced due to alteration in placental circulation), heart diseases, hypertension, drug addiction, alcohol abuse, and social economic factors. during pregnancy period mothers visits hospital for pre-natal check-ups and information are collected during this period. However, this information is never utilized in making decision in advance towards the weight of the baby expected at birth. The purpose of this study WAS to develop an inverse regression model that predicts the weight of the baby in advance based on the mother's pre-natal information. The parameters of the model were estimated by ordinary least square (ols) method, hence the regression model formulated. The model was applied on secondary data collected from Kakamega county referral hospital. Based on the mother's information collected from the hospital, the baby's weight can be predicted in advance with small error before delivery. Hence, the estimated or predicted weights of the unborn baby will assist the health care practitioner to categorize the baby into low birth weight, normal weight, or overweight. This information will help hospital management and other policy makers (such as ministry of health) to provide a range of available medical, nutritional, and educational interventions.

Keywords: *estimation; weight; pre-natal information; regression*

Improvement and Reduction in child mortality and morbidity through community midwifery

O. Otieno and Lucy. Chikamai

Abstract

The high rate of maternal and infant mortality and morbidity in Kenya is a source of concern at this time. A few years back, this could have been attributed to the fact that most mothers delivered their babies at home, where poor hygienic conditions, lack of qualified personnel and poor access to medical facilities was prevalent. Currently, the level of population education and diet has improved significantly. New programs with new policies, for example "beyond Zero" have been launched, with a view to reducing this rate. There also has been improvement in infrastructure, population education and human resource. Despite these efforts, both maternal and child mortality and morbidity rate still remains a source of concern. Many questions and challenges remain unanswered. This paper reviews the current status, the challenges and make suggestions addressing this issue.

Key word:?

Phytochemical Screening aad Antimicrobial Activity of *Microglossa Pyrifolia* Lam Kuntze Plant Extracts on *Escherichia coli*, *Candida albicans* and *Staphylococcus aureus*

Abstract

Microglossa pyrifolia is a plant in the family Asteraceae which consists of many medicinal plants. It has been used globally for traditional medicine, in Africa it is used by many communities as a cure for varied diseases. In Bungoma Kenya the leaves are dried then burnt and the resulting concoction used in treating the circumcision wound. Studies on it have focussed on its antiparasitic properties though its antimicrobial activity has not been investigated. The objectives of this study were to: investigate the antimicrobial properties of *M. pyrifolia* extracts, determine the concentration that is most effective and to identify the phytochemicals present in the plant. The leaves of the plant were collected from Kamusinga village in Bungoma, they were dried under the shade then crushed to obtain fine powder which was then used to obtain the crude plant extracts using soxhlet apparatus with water and methanol as solvents. The extracts were then constituted to 10%, 7.5%, 5% and 2.5%. A control experiment was done using distilled water. The extracts were subjected to qualitative test for the identification of various phytochemical constituents. The antimicrobial assay was performed by agar well and disc diffusion methods. Treatments were replicated thrice and the plates examined for zones of inhibition. Terpenoids, saponins, alkaloids, flavonoids and steroids were the major phytochemical groups detected. There was a significant difference in the effect of the concentration ($p \leq 0.05$) to the inhibition zone for the three microorganisms at 7.5% indicating that this was the optimal concentration for use. The activity of the extracts on the microorganisms was significantly different at $p \leq 0.05$ for *S. aureus* and *E. coli* at concentrations of 0% and 10% however *C. albicans* was significantly different from the rest at $p \leq 0.05$. This study reveals that this plant contains bioactive constituents and its use in the treatment of wounds should be investigated further for sustainable use and for posterity.

Key words: *Traditional medicine, phytochemical analysis, antimicrobial activity.*

Lifestyle Diseases and Management: Mathematical Models

Boniface O. Kwach

Abstract

Lifestyle diseases are those associated with the way a person or group of people live. These diseases are caused by unhealthy behavior and other factors which are either controllable or not. It is caused by a person's habit, behavior and practices. An example of lifestyle disease is Diabetes. This study presents a mathematical model for Blood Glucose Regulatory System (BGRS) which includes epinephrine as a third variable in the form, $\dot{Y} = AY$; and whose solution has been analyzed for equilibrium and stability to provide the blood glucose concentrations for diabetics and non-diabetics. It is established that the final model is asymptotically stable compared to the existing models, that is, the eigenvalues of the coefficient matrix are complex numbers with negative real parts. Furthermore, the resonance period for the final model, that is, $T_0 = 2:9847134$ hours, is far less than that of the existing model, showing that the glucose concentration returns to normal level within a shorter time. The study also presents a Mathematical Model Insulin Therapy in Patients with Diabetes Mellitus which includes external rate at which blood glucose, insulin and epinephrine are being increased in the form, $\dot{Y} = AY + \sim r(t)$ and whose solution was analyzed to provide the systems natural frequency, ω_0 , which is the basic descriptor of saturation level of the drug. It established that the resonance period for the final model, that is, $T_0 = 3:76912$ hrs, is in

the acceptable therapeutic range and agrees well with the data for the existing insulin therapy. By employing the model, it is shown that, the peak, which is the time period for insulin to be most effective in lowering blood sugar, is shorter than $T_0 = 5:3199$ hrs, for the existing model. This model would help the medical practitioners to predict drug therapy in patients with Diabetes Mellitus, in such a way that the concentration of the drug remains in the therapeutic range.

Keywords: *Mathematical model, Linear system, Resonance period*

Importance of Exploration of Microbial Biodiversity

Siamba et al

Abstract

The microbial world is the largest unexplored reservoir of biodiversity on the earth. It is an important frontier in biology under intensive investigations. The exploration of microbial diversity has been spurred by the fact that microbes are essential for life since they perform numerous functions essential for the biosphere that include nutrient recycling and environmental detoxification. The management and exploitation of microbial diversity has an important role in sustainable development with the industrial and commercial application of microbial diversity worth millions of shillings. Given the heterogeneity of natural environments and the enormous potential of microorganisms to provide novel pharmaceuticals, fine chemicals and new technologies, the biotechnology industry has a vast, largely untapped resource for the discovery of new chemicals and novel processes. However, despite the obvious economic value of microbial diversity, microorganisms have been largely ignored in debates on the conservation and management of global diversity. There is, therefore, an urgent need to persuade policy-maker to be more concerned about the conservation, management and exploitation of microbial diversity. There are a number of reasons why the conservation of microbial diversity has not received the same attention as plants and animals. For example, microorganisms are invisible, less familiar and perceived primarily as agents of disease. With respect to the role of microorganisms in sustainable development, little is known about the potential contribution of microbial diversity to the national economy, to wealth creation and to improvements in the quality of life. An appreciation of these factors might be one way of changing government and public perception of microorganisms by showing that the sustainable use of microbial diversity has positive economic value. This would help justify the costs involved in conserving microbial diversity, but equally provide a useful indicator of the costs of inaction. In terms of the scientific rationale needed to underpin policy, quantification of microbial diversity has been limited. This makes it difficult to indicate what needs to be conserved in order to support the biotechnology industries and to understand fully the interactions between organisms responsible for maintaining a functional ecosystem.

Keywords: *Microbial diversity, nutrient recycling, ecosystem functioning, exploration, conservation.*

Clinicopathological Features, Treatment, and Outcome of Pregnancy-Associated Breast Cancer in Ahmadu Bello University Teaching Hospital, Zaria, Northwestern Nigeria

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Background: Pregnancy-associated breast cancer (PABC) is breast cancer diagnosed during pregnancy or within 1 year of delivery. It is the most frequent malignancy diagnosed during pregnancy or lactation. There is paucity of literature of PABC in Northwestern Nigeria. **Aim:** To highlight the clinicopathological features, treatment, and outcome of PABC in Ahmadu Bello University Teaching Hospital (ABUTH), Zaria, Northwestern Nigeria. **Methods:** It was a 6-year prospective study of PABC from January 2007 to December 2012 at ABUTH Zaria. Information documented included patients' biodata, clinical features, pathological types, receptor status, staging, treatment, and outcome of PABC patients seen in ABUTH. **Results:** About 1344 had breast cancer during the study period. Thirty one patients (2.3%) had PABC. Age ranged 20–43 years, median of 31 years. Common clinical features were breast lump/mass –27 (87.1%) patients, skin thickness 10 (32.3%), nipple retraction 9 (29.0%), and inflammation 6 (19.4%). Nineteen (61.3%) patients were diagnosed in pregnancy: 1st trimester, 4 (12.9%); 2nd trimester, 7 (22.6%); 3rd trimester, 8 (25.8%); while 12 (38.7%) were within 1 year of delivery. Twenty-two patients (71.0%) had advanced disease. Twenty-four (77.4%) patients had invasive ductal carcinoma. Eight (36.4%) patients were ER/PR positive. Six (27.3%) were triple negative and 2 (13.6%) were HER 2 positive. Twenty-four patients (77.4%) had vaginal delivery. Three patients (9.7%) had spontaneous abortion and 1 patient (3.2%) had still birth. Twenty-five babies (80.6%) were alive and well. Seventeen patients (56.9%) had modified radical mastectomy (2 patients in 2nd trimester and 15 patients after delivery), 25 (80.6%) had chemotherapy, 14 (45.2%) had radiotherapy, and 1 (3.2%) received trastuzumab. Mortality was 8 (25.8%). **Conclusion:** PABC constituted 2.3% of all breast cancer patients in our hospital. Majority (71%) presented with advanced disease. Three out of every four were invasive ductal carcinoma, while one in four were triple negative. The mortality was 25.8%.

Quality of Life of Breast Cancer Patients Receiving Chemotherapy in Delta State University Teaching Hospital, Oghara

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Introduction: The World Health Organization defines the quality of life (QOL) as the individual's perception of life, its values, objectives, standards, and interest in the framework of culture. This is increasingly been used by investigators to assess treatment outcomes in terminal diseases and malignancy. The complications of chemotherapy negatively impact on the QOL of breast cancer patients receiving chemotherapy alongside the negative impact of the primary

pathology. **Aim:** The objective of this study is to describe the QOL in breast cancer patients receiving chemotherapy in Delta State University Teaching Hospital, Oghara. **Materials and Methods:** This is a questionnaire-based study; the European Organization for Research and Treatment of Cancer QOL Questionnaire, breast cancer module was used to measure QOL in the study population. The module assesses both the patient's functional and symptom scales. **Results:** There were 39 patients in this study; all were females with advanced breast cancer at various cycles of chemotherapy. The mean age was 49.02 years, with range of 31–63 years. Thirty-two patients (82.05%) had favorable body image, 17 (43.59%) had no or minimal side effects from systemic therapy, 22 (56.41%) had no or minimal breast symptoms, and 21 (53.85%). While 27 had hair loss, only 3 (11.11%) were very upset with the hair loss. Twenty-four patients (61.53%) were significantly worried about their future health and only 12 (30.77%) had any interest in sex in the preceding 4 weeks of the interview. **Conclusion:** This study shows that breast cancer patients receiving chemotherapy had a favorable QOL in spite of the late stage of presentation.

Drug Resistance Patterns of Mycobacterium Tuberculosis Complex and Associated Factors among Retreatment Cases at Jimma University Specialized Hospital, South West Ethiopia

Kedir-Abdella et al

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Abstract

Background: The global burden of tuberculosis(TB) has been accompanied with the emergence of multidrug-resistant tuberculosis(MDR-TB).The rate of MDR-TB is five times higher among previously treated tuberculosis cases than new cases.

Objective: The objective of this study was to determine drug resistance patterns of Mycobacterium tuberculosis complex (MTBC) isolates and associated factors among retreatment cases.

Methods: A facility-based cross-sectional study was conducted in from March 2012 to April 2013. A total of 79 sputum smear positive retreatment cases were enrolled in the study. Socio-demographic characteristics and clinical data of patients were collected using questionnaires. Sputum specimens were collected, cultured and drug susceptibility testing (DST) was done for four first line drugs of streptomycin, isoniazid, rifampicin and ethambutol system using indirect proportion method. Statistical analysis of the data (Chi-square and logistic regression) was done using SPSS V-20.

Results: DST was conducted for 70 MTBC isolates. Any drug resistance was detected in 58.6% of isolates. The overall prevalence of MDR-TB was 31.4%. Place of residence ($p=0.032$, 95% CI =1.11, 10.60), duration of illness ($p=0.035$, 95%CI= 1.10, 10.62) and multiple treatment ($p=0.048$, 95%CI=1.01, 8.86) were associated with any drug resistance. The history of treatment failures ($p=0.028$, 95% CI: =1.14, 10.28) was found to be predictor for MDR-TB.

Conclusion: The prevalence of MDR-TB was higher than the world health organization estimation for Ethiopia. The rate of MDR-TB was higher in patients with the history treatment failures. Hence, patients with the history of treatment failures should timely be identified and referred for culture and drug susceptibility testing.

Key words: *Tuberculosis, MDR-TB, Drug resistance, drug susceptibility*

Synopsis on Lifestyle Diseases in Kenya

James Kisaka Waswa

Abstract

Quality in health care is defined as doing the right thing (getting health care services you need at the right time when you need it), in the right way that is (using the appropriate test or procedure to achieve the best possible results); (“Tri-Star horizon medical centre December 2010”)

The institute of medicine defines health care by six attributes:

- Safety – patient should not be harmed by the care that is intended to help them
- Patient centered- care should be based on individual needs
- Timely- waits and delays should be reduced
- Effective – care should be evidence-based
- Equitable- care should be equal to all people

Lifestyle diseases

Lifestyle diseases (also sometimes called **diseases of longevity** or **diseases of civilization** interchangeable) are defined as diseases linked with the way people live their life. This is commonly caused by alcohol, drugs and smoking abuse as well as lack of physical activity and unhealthy eating. Diseases that impacts on our lifestyle are; heart diseases, stroke ,obesity and type 2 diabetes. The diseases that appear to the increase in the frequency as countries become more industrialized and people live longer. They can include Alzheimer’s disease, arthritis, atherosclerosis, asthma, cancer, chronic liver disease or cirrhosis, chronic obstructive pulmonary disease, type 2 diabetes, Heart disease, metabolic syndrome, chronic renal failure, osteoporosis, stroke, depression and obesity. In the UK the death rate is four times higher from the respiratory disease caused by unhealthy lifestyle. Some commenter maintain a distinction between diseases of longevity and diseases of civilization. Certain diseases such as diabetes, dental caries or asthma appear at greater rates in young populations living in “western “ way; their increased incidence is not related to age, so the terms cannot accurately be used interchangeably for all disease. In Kkenya, non communicable diseases (NCDs) also known as chronic diseases or lifestyle diseases are not passed from person to person they are long duration and generally slow progression. The four main types of NCDs are; cardiovascular diseases like heart attack, stroke, cancers, chronic, respiratory conditions such as asthma or diabetes share four manger behavioral risk factors, namely ; tobacco use, exposure to unhealthy diet, physical inactivity, harmful use of alcohol.

That’s why the Kenya Health policy 2012 to 2030 aims at attaining the highest possible standards of health in a manner responsive to health needs of the population. This policy will be achieved through six objectives which includes halting and reversing the rising burden of NCDs reducing the burden of violence and injuries, minimizing exposure to health related factors which have a baring on NCDs prevention and control (Mr James Macharia Cabinet Secretary MOH)

COncussions and reccomendations

Inter-relationship of Corporate Governance Mechanisms and Financial Performance of Coffee farmer’s Co-operative Societies in Kenya.

Abstract:

The paper shows that the performance of coffee farmer's co-operative societies is a function of the interplay of corporate governance mechanisms: Board Size, Board Composition and status of the Chief Executive Officer (CEO). The paper has been built from that recommended a further research on the effect inter-relationship of corporate governance mechanisms and financial performance amongst coffee farmer's co-operative societies in Kenya. In essence to find out the effect of multicollinearity between the explanatory variables, but not high enough to cause serious problems. The research used the times-earned- interest as performance variable, guided by the null hypothesis that there is no relationship between the interplay of corporate governance mechanisms and performance. Indeed analysis results showed that there exist a relationship between performance and the interplay of corporate governance mechanisms in farmer's co-operative societies, thus rejecting the null hypothesis.

Key Words: *Corporate governance, corporate governance mechanisms, performance*

Analysis of student deviant behaviour most prevalent in schools of Bungoma County

Janet Nabiswa, Bernard L. Misigo, Ferdinand N. Makhanu

Abstract

Deviant behaviour in secondary schools continues to be a matter of global concern; more so in developing countries like Kenya. Knowledge of the kinds of deviance being indulged in and the role it plays in particular individuals, groups, schools, communities or sub-cultures is vital for any prevention programme yet this has been missing. Whereas several studies have been done in Bungoma County targeting student indiscipline and specific deviancy like theft, bullying and devil worship, limited studies exist that have purposed to undertake a holistic assessment to enable a fair picture of deviancy prevalence in the schools within the County. The purpose of this study is to address this gap by examining types of deviance and their prevalence in selected secondary schools of Kimilili Sub County, Kenya. Using a sample survey design, data was collected through questionnaires and interview schedules. Data was analyzed descriptively. The study established that all the twelve sampled types of deviant behaviour exist in schools of Kimilili Sub County but in varying intensity or scale of severity. The most prevalent was theft at 21% while the least prevalent was bullying at 3%. The findings give an empirical backing for education sector stakeholders to reengineer their strategies on addressing deviance among students and mitigate the worrying trend of deviant behaviour in schools. The study recommends that while students' rights to self expression besides other rights as envisioned in the United Nations (UN) Convention should be respected, there is need among schools to take cognizance of dynamism of deviance and diversity of norms being driven by modernity and complex societies of the 21st century. This will enable schools to tame intolerable deviance among students.

Key words: *Deviance, Secondary Schools, Prevalence, Bungoma County.*

Statistical Analysis of School Factors as Correlates to Secondary Students' Achievement in Mathematics in Bungoma County, Kenya

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Abstract – There is abundant research evidence to support the view that when Mathematics is taught in an enabling environment, a lot of enjoyable learning takes place. But in reality this is not always so, the implication is that students' achievement in this subject still continue to dwindle. This paper therefore aims at finding the extent to which school factors predict secondary school students' achievement in Mathematics. The study will adopt the descriptive survey research design of the ex-post facto type and make use of a sample of Mathematics teachers and principals selected through a multi-stage sampling procedure. Instruments will be developed and validated for the study. The two instruments to be validated and used are School-based Inventory correlation coefficient, r , and School-Based Factor Questionnaire. The hypotheses will be tested at 0.05 level of significance. Data collected will be analyzed using means, standard deviation and multiple regressions.

Keywords: *Leadership, School factors, Supervision, Instructional materials, Quality of Instruction*

ESTIMATION OF MULTIPLE TRAITS IN A PRODUCTION PROCESS

John L. Sirengo

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Abstract – Monitoring a very large population of size $N \longrightarrow \infty$ is an important part of industrial, agricultural and human risk assessment. In applications where trait prevalence is likely low, it is common to test pools of subjects or specimens for the presence of a trait, rather than one-at-a-time testing. This technique is known as pooled (group) testing. In this paper, we shall revisit the problem of estimating the prevalence of a trait from pool testing, but we consider applications with multiple traits. The paper is unlike the previous research in pooled testing, which has largely assumed a single trait. To accomplish this, the study will employ the method of maximum likelihood estimator (MLE) in obtaining the estimators. For comparison with one-at-a-time testing procedure, properties of the estimators will be discussed. Furthermore asymptotic relative efficiency (ARE) will be constructed. Monte Carlo Simulation will be used in generating the mean square error (MSE) and Bias of the estimators.

Keywords: *Trait, pool testing, cut off value, Proportion,*