Information systems education in Kenya: Students' specialization choice trends (a case study of Kenya Polytechnic University College)

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ABSTRACT

The objective of this study was to determine the time and level of Information Systems (IS) awareness among Kenyan university students and the choice of IS as a field of specialization. The study posited that the choice of a field of specialization is dependent upon a student's awareness of its existence, its utilization in the real world, its career opportunities, and its strategic importance to the country's economic development agenda. It posited further that early IS awareness could have a positive impact on the choice of IS as a field of specialization. The underlying assumptions were that the time of IS awareness as a field of specialization among Kenyan university business students was late and levels low, leading to possible low levels of choice of IS as a field of specialization. Using the survey method, the case study found late and low levels of IS awareness as a field of specialization among university business students. Future studies linking time and levels of IS awareness with choice of IS as a filed of specialization and with existence of requisite IS skills in the country (or lack thereof) are suggested.

Keywords: Specialization, Awareness, Systems Analytical Skills, Joint Admissions Board, Public Universities, University Colleges, Parallel Programmes.

1. INTRODUCTION

1.1   The History of Information Systems

Although the history of Information Systems (IS) as a subject of study only spans six decades, it is among disciplines that have done much towards advancing development of the human race (Jorgenson and Vu, 2009). Today, this fact is evident in the roles played by the Internet, the Local Area Networks within enterprises, and the Wide Area Networks that connect multinational corporations throughout the globe. By the mid 1960s IS was already forging its way into the business mainstream. At that time a number of business schools began to develop Management Information System (MIS) programs to meet the perceived growing needs of IS managers. By the 1970s, upper level management was recognizing the importance of IS to both business operations and business management and the flexibility it was able to bring to the entire organization. Telex became the standard for information transfer, while the mainframe computer became the standard for database implementation (Laudon & Laudon, 1987b; Lyytinen & Newman, 2008). By the mid 1980s most manufacturing companies had embraced IS for much of their operations such as forecasting sales, taking orders, and managing distribution of their products. By the mid 1990s, it was evident that a corporation could not effectively and efficiently do business without a solid functioning IS setup, both inside its own walls as well as connecting it with its supply-chain stakeholders such as vendors and distributors. Electronic Data Interchange (EDI), previously known as Electronic Data Processing (EDP), brought profit margins low to the extent that any business that did not use it found itself out of business within only a short period of time. Today, the internet, the moral fiber of IS, has enabled expansion of both business and industry into global markets. As a result, the globe has become the market place for many enterprises, both big and small (Haag & Cummings, 2012).

1.2   Definition of Information Systems

Information Systems is a technology driven system that can be defined technically as a set of interrelated components that collect, retrieve, process, store and distribute information to support decision making in an organization (Alter, 1999). It has also been defined as a system that assembles, stores, processes, and delivers information relevant to an organization (or to a society), in such a way that the information is accessible and useful to those who wish to use it, including managers, staff, clients, and citizens (McCleod, 1990; Armstrong, 2001). It is a social (human activity) system that may or may not involve the use of computer systems (Thompson, 2005; Baltzan, In addition to supporting decision-making, information systems help managers and other workers analyze complex problems, develop new products, and integrate various modules both within and across departments (Alter, 2001; Haag & Cummings, 2012). Moreover, the transmission of information and data made possible by IS allows inter-departmental communication, leading to better coordination and improved transparency by sharing information throughout the organization (Thompson, 2005).

According to Anthony & Govindarajan (1995), Information Systems is any combination of information technology and people activities that support operations, management, and decision making. In a very broad sense, the term "information system" is frequently used to refer to the interaction between people, processes, data and technology (Armstrong, 2001). In this sense it refers not only to the information and communication technology (ICT) that an organization uses, but also to the way in which people interact with it in supporting business processes (Alter, 1999). Clear distinctions have often been made between information systems, computer systems, and business processes. Information systems typically include an ICT component but are not purely concerned with ICT, focusing instead, on the end use of information technology (McCleod, 1990). Information systems are also not to be confused with business processes whose performance they control (Turban, Mclean, & Wetherbee, 2002; Frenzel, 2004).

In most cases, IS are formal, computer-based systems that play integral roles in organizations. Although most are computer-based, any (old) computer or software program is not necessarily an information system. Electronic computers and related software programs are only the technical foundations, the tools, and materials of modern information systems (McCleod, 1990). To understand an information system, one needs to understand the problems it is designed to solve, both the architectural and design solutions, and the organizational processes that require these solutions (Bateman & Snell, 1990; Willocks, 1996). Although IS has evolved over the past sixty years to become the backbone of business and industry that it is today, the simple application rules created in the 1960s and 1970s still remain relevant in applications where data or information is transferred whatever the business model, no matter the complexity (Laudon & Traver, 2011; Haag & Cummings, 2012). In the advent of computing, the assessment and evaluation of old manual systems has inevitably resulted into the implementation of automated systems through the use of computers (Callon, 1996; Willocks, 1996).

1.3   The Discipline of Information Systems

As a discipline of study, IS has to do with the assessment and evaluation of both existing and prospective business systems, both manual and computerized, with the objective of improving their performance in terms of both efficiency and effectiveness, using such systematic tools and approaches to the analysis and design of information systems as the structured systems analysis and design method (SSADM) (Harris, 2009). The assessment and evaluation of systems, existing or conceived, is a fundamental step in the systems development life cycle (SDLC) (Whitten & Bentley, 2005). Inarguably, a poorly analysed and designed system is a failed project on the 'get go', regardless of the amount of resources deployed further along the development process (Jarke, Loucopoulos, Lyytinen, Mylopoulos, and Robinson, 2011). This makes it important and

necessary to develop specific and dedicated skills for the analysis and design purpose, which are Systems Analyst and Designer skills within the IS discipline (Harris, 2009). Businesses rely on information systems professionals to address pertinent issues of: What information does the enterprise need? How is that information generated? Is the information delivered to the people who need it – on a timely manner? Is the information presented to the people who need it in ways that permit them to use it readily? Is the organization structured in a way that makes it possible for it to use technology effectively? Are the business processes of the organization well designed? Do the business processes use the opportunities created by information technology fully? Does the organization use the communication and collaboration capabilities of information technologies appropriately? Is the organization capable of adapting quickly enough to changing external circumstances?

1.3.1   Information Systems Academic Programs
As a discipline of study, information systems has also been described as the study of complementary networks of hardware and software that people and organizations use to collect, filter, process, create, and distribute data (McCleod, 1990; Petter et. al., 2008). The study of information systems bridges business and computer science using the theoretical foundations of information and computation to study various business models and related algorithmic processes within the computer science discipline (Lyytinen & Newman, 2008; Popova & Sharpanskykh, 2010). Before the concept of management information systems was created, computer scientists were just programmers creating applications for science and math calculations (Harris, 2009). As computer usage evolved in the fields of business and data management, software applications were needed to process nonscientific data. A field of study to bridge the gap between computer programmers and the business world to create information-based applications for business and networks was needed, thus, MIS was born (Curtis, 1995; Laudon & Laudon, 2004). Today a large majority of Information Systems programs within universities are located in business schools with different names such as *information systems*, *management information systems*, *computer information systems*, *business information systems*, or *business information technology*. Information systems related degree programs combine business and computing topics, except that the emphasis between technical and organizational issues vary from one program to the next.

2.   PROBLEM STATEMENT – SYSTEMS ANALYSIS SKILLS GAP

Computing is speedily coming of age in Kenya. That notwithstanding, however, there has been identified certain skill gaps in the disciplines related to computing. More specifically, critical systems analysis skills have been identified as either lacking or inadequate. Case in point is a recent (2011) study commissioned by the Kenya Information Technology and Communications Board (KICTB) in collaboration with IBM that identified some skills gaps in the ICT sector, including systems analysis skills (Systems Analysts). According to the study, the problem is serious enough that a large majority of firms within the country have to make use of expatriates at extraordinary costs to meet their needs. The study determined further that the existing comparatively high salaries of Systems Analysts have failed to attract the talent internationally since the demand is high globally. Because of this high demand, the few Systems Analysts that may be produced locally are quickly attracted to and taken up by more developed economies able to offer higher salaries and benefits, making an already bad situation even worse.

Public universities and university colleges and private universities in Kenya offer robust Computer Science programs that produce large numbers of Computer Scientists. In addition, many public and private colleges produce large numbers of Computer Programmers savvy in developing computer systems and applications. This combination of university graduate Computer Scientists and college graduate Computer Programmers has provided a good number of Systems

Developers, as evidenced by the large number of computer applications coming into the local market and by the increasingly large number of robust websites that are developed locally. Although these are good steps in the right direction, the fact is that a good computer scientist or programmer does not make up for a good systems analyst, just as a good computer science academic program does not make up for a good information systems academic program. The two are complementary to but not substitutes of each other. The main problem and the focus of this study is that *Information Systems* as an academic discipline seems to be largely unknown to high school students in Kenya, making it impossible for them to select it as an area of specialization in their university education. Moreover, as a possible area of concentration, commerce/business students may not be introduced to IS as a possible choice. The net effect is that the level of IS education in the country has suffered, resulting in a deficiency in systems analysis and related skills.

3.   INFORMATION SYSTEMS EDUCATION IN KENYA

In the Kenyan context, computer science as a discipline of study has taken strong roots so that just about every university offers it as an area of specialization. As can be seen from Table 2 below, 20 of the 32 public universities and colleges offer a Bachelor of Science in Computer Science degree. Although the course content and the degree earned at the end of the computer science program among all the public universities are unambiguous, the same cannot be said of the other computer related disciplines of Information Technology (IT), Computer Information Systems (CIS), Computer Information Technology (CIT), Information and Communications Technology (ICT), Business Information Technology (BIT), Management Information Systems (MIS), and Information Systems (IS) – wherever offered.

Admission into a public university in Kenya is done by the government exclusively through a body popularly known as the Joint Admissions Board (JAB) (see Appendix B). It is this board that sits periodically to select qualified students whom it assigns to the different disciplines and to the different public universities and university colleges. As part of this exercise, public universities identify and provide their periodic student needs within specific disciplines to the JAB to fill. It goes without say, therefore, that in order for a student to be assigned to a discipline (area of specialization), the need has to have been identified by a university (or university college) and that information provided to the JAB *a priori*. Since *Information Systems* is not a recognized area of specialization in Kenya, public universities do not provide the JAB with their IS requirements, and therefore students do not get admitted into it. A close scrutiny of the JAB admission guidelines and process by this study has revealed that neither IS nor MIS is provided to the JAB by universities and university colleges as possible areas of specialization. A part from a Bachelor of Science in Computer Science, the other computer related degree options available to 'JAB students' are Bachelor of Science in Mathematics and Computer Science (BSc.MCS), Bachelor of Business Information Technology (BBIT), Bachelor of Science in Informatics (BSc.Informatics), Bachelor of Applied Computer Science (BACS), Bachelor of Technology in Business Information Technology (BTech.BIT), Bachelor of Business Information and Management (BBIM), and Bachelor of Software Engineering (BSE) as can also be seen from Table 2 below.

Public universities in Kenya dominate the higher education landscape by admitting the largest number and the best qualified students on both full and partial scholarships. Although the scenario is rapidly changing, public universities continue to set such standards in the sector as the academic disciplines, areas of specialization, and the areas of concentration within disciplines such as in the Bachelor of Commerce (B.Com.) programme. This sector dominance has been aggravated, rather than helped, by the introduction of 'parallel' (Module II, private, or self-sponsored) programmes. Because public universities have had more robust infrastructure and structural systems in place for longer periods of time, they have so far been able to admit more

private (non-JAB) students than private universities. For these reasons, public universities provide a representative picture of the higher education landscape in the country.

Table 2: *Computer Related Courses in Kenyan Public Universities*

Course	*Public University*
BACHELOR OF SCIENCE (Computer Science)	1. University of Nairobi
	2. Kenyatta University
	3. Moi University
	4. Egerton University
	5. Jomo Kenyatta University of Agriculture & Technology
	6. Maseno University
	7. Masinde Muliro University of Science & Technology
	8. Kimathi University College
	9. Chuka University College
	10. Kisii University College
	11. Narok University College
	12. Meru University College
	13. Kabianga University College
	14. South Eastern University College
	15. Multimedia University College of Kenya
	16. Laikipia University College
	17. Karatina University College
	18. Chepkoilel University College
	19. Kibabii University College
	20. Machakos University College
BACHELOR OF SCIENCE (Mathematics and Computer Science)	1. Jomo Kenyatta University of Agriculture & Technology
	2. Maseno University
	3. Mombase Polytechnic University College
	4. Meru University College
	5. Multimedia University College of Kenya
	6. Taita Taveta University College
	7. Kirinyaga University College
BACHELOR OF BUSINESS INFORMATION TECHNOLOGY	1. Jomo Kenyatta University of Agriculture & Technology
	2. Meru University College
	3. Multimedia University College of Kenya
	4. Muranga University College
BACHELOR OF SCIENCE (Informatics)	1. Moi University
	2. Chepkoilel University College
BACHELOR OF APPLIED COMPUTER SCIENCE	Kisii University College
BACHELOR OF TECHNOLOGY (Business Information Technology)	Kenya Polytechnic University College
BACHELOR OF BUSINESS INFORMATION AND MANAGEMENT	Kisii University College
BACHELOR OF SCIENCE (Computer Security and Forensics)	Bondo University College
BACHELOR OF SOFTWARE ENGINEERING	Kisii University College

3.1 Business Information Technology

A relatively new computer related area of specialization is emerging in Kenya called Bachelor of Business Information Technology (BBIT). Table 3 provides a summary of some of the universities, both public and private, that offer the BBIT degree program along with their course descriptions.

Table 3: Kenyan Universities and Colleges that offer BBIT Degrees

Name	Course Description
Kenya Polytechnic University College (KPUC)	The Bachelor of Technology in Business Information Technology (BTech.BIT) degree prepares candidates to meet the increasing demand for IT professionals in the modern business environment with a wide knowledge of business management technical skills and the capacity to harness and implement IT strategies, taking advantage of emerging technologies. The course is structured to focus on issues surrounding: a) development and implementation of IT solutions that meet organizational strategies; b) strategic use of information systems to give organizations a competitive advantage through proper information management; and c) Management of ICT as a strategic corporate resource. Thus BTech.BIT offers a combination of Computer Science, Business Management, and Human Development courses. The degree is offered in the Department of Management Science and Technology within the School of Business and Management Studies.
Jomo Kenyatta University of Agriculture and Technology (JKUAT)	The Bachelor of Business Information Technology (BBIT) is a degree that prepares candidates to become specialists in the information technology needs of modern businesses. The course is designed to meet the increasing demand in the market place for IT professionals with a wide knowledge of business management, technical skills and the capacity to harness and implement IT strategies, taking advantage of emerging technologies. The degree is offered in the Department of Commerce and Economic Studies.
Strathmore University	The Bachelor of Business Information Technology (BBIT) is a degree program that prepares students to work in the fields of software development, database administration and networking. It is a modern course that brings together two key aspects of computer training: the link between information technology (IT) and the business environment. The degree program prepares students for the job market through knowledge of IT with an understanding and appreciation of how business is organized and managed. The degree is offered in the Faculty of Information Technology.
Kenya Methodist University (KEMU)	Its website asserts that in order to be effective, organizations have realized the importance of developing an IT strategy that fully supports the business strategy. The Bachelor of Business Information Technology (BBIT) is designed to provide students with expertise in the development and use of computer systems for solving business problems and making managerial decisions.
Mount Kenya University	Its website asserts that Business Information Technology is changing continuously and rapidly. Globalization and liberalization are radically reshaping technologically the business information development practices. The Business Information Technology degree program provides an interdisciplinary approach for training business information technology professionals who need working competency in all sectors of the economy. The program, therefore, provides business information graduates with a real world technological experience that prepares them for the fields of business and information technology for the economic growth and prosperity of Kenya, the region and the world at large.

Outside Kenya, only a few universities offer BIT degrees, with Virginia Tech University in the US and Singapore Polytechnic College being some examples. According to the information provided on its website, the Department of Business Information Technology (BIT) at Virginia Tech offers a BBIT undergraduate major designed to provide students with expertise in the development and use of computer systems and quantitative modeling techniques for solving business problems and for making managerial decisions. Students learn the necessary information technology (IT) and computing skills plus quantitative and modeling techniques, to develop and implement sophisticated business-related computer systems. The degree program focuses specifically on the practical application of computing to business problem-solving. Students specializing in BIT may choose one of two options reflecting their specific career objectives and interests: *Decision Support Systems* and *Operations and Supply Chain Management.* Singapore Polytechnic College offers a Diploma in Information Technology in the School of Social Media and InfoComm Technology. Its website asserts that social media, mobile applications and business analytics are three global trends that are increasingly used by companies to meet business objectives such as lower cost and high growth. With Business IT, a student is able to learn the latest tools in social media, mobile applications and business analytics. Coupled with a solid business foundation and an entrepreneurship spirit, a student can turn any business problem into a cutting edge technology enterprise, the website asserts.

4. RESEARCH METHODOLOGY

4.1 Survey Method

The survey method was used in gathering data for this case study. The Survey instrument (see Appendix D) was administered to a group of business students at the Kenya Polytechnic University College (KPUC) in December 2011. The sample, a group of 75 JAB students in the Bachelor of Commerce (B.Com.) and Bachelor of Economics (B.Econ.) degree programmes, was presupposed to be representative of the 'JAB student' population throughout the Kenyan university education system. Under this presupposition, the results of this study can be inferred to apply to other public universities in Kenya. Because of the dominance of the public university system in the higher education sector, the results of this study can be inferred to the entire Kenyan university education system.

4.2 Survey Instrument

A four-page questionnaire with 12 major questions was administered to a group of 75 students taking a section of the *IS Concepts* class at KPUC between September and December 2011. The 12 major questions sought information on the following areas: 1) personal information; 2) education; 3) specialization; 4) concentration; 5) other trainings; 6) IS awareness; 7) IS impressions; 8) IS specialization; 9) retrospect; 10) Bachelor of IS; 11) Policy on 'specialization' in Kenya; and 12) Policy on 'specialization' elsewhere. A detailed description of the respondent characteristics is given in Appendix B.

4.3 Survey Data

4.3.1 Personal Information
With respect to gender, 53 (71%) of the respondents were male, while 22 (29%) were female. With respect to age, 2 (3%) of the respondents were 23 years of age; 4 (5%) 22 years of age; 21 (28%) 21 years of age; 24 (32%) 20 years of age; 22 (29%) 19 years of age; while another 2 (3%) were 18 years of age.

4.3.2   Education

Of the 75 respondents, 72 (96%) had completed ordinary 'O' Levels (the Kenya Certificate of Secondary Education (KCSE)) while the other 3 (4%) had completed advanced 'A' Level education. In terms of when the respondents undertook their secondary school education, 1 (1%) completed 'O' Level education in 2005; another 1 (1%) in 2008; 46 (61%) in 2009; while another 1 (1%) completed in 2010. The remaining 26 (35%) did not indicate the year they completed 'O' Level education. The three students who undertook 'A' Level education completed it in 2009. With regard to country: 54 (72%) indicated Kenya as the country where they undertook their 'O' Level education, while 21 (28%) did not respond to this question. With regard to province: 21 (28%) undertook their 'O' Level education in the Central Province of Kenya; 6 (8%) in the Eastern Province; 3 (4%) in the Western Province; 11 (15%) in the Rift Valley Province; 7 (9%) in the Nyanza Province; 5 (7%) in the Nairobi Province; while 22 (29%) did not respond to this question.

4.3.3   Specialization

With regard to area of specialization: 46 (61%) of the respondents indicated Bachelor of Commerce as their area of specialization while the other 29 (39%) indicated Bachelor of Economics as their area specialization.

4.3.4   Concentration options

For those respondents in the Bachelor of Commerce specialization, 23 (31%) indicated Accounting as their area of concentration; 12 (16%) Finance; 2 (3%) Insurance; 4 (5%) Business Administration; 2 (3%) Entrepreneurship; 2 (3%) Supply Chain Management; while 1 (1%) did not respond to this question.

4.3.5   Other Training

When asked whether they were undertaking any other trainings either at KPUC or outside KPUC concurrently with their current university education at KPUC, 33 (44%) said 'Yes', 41 (55%) said 'No', and 1 (1%) did not respond.

4.3.6   IS Awareness

When asked when was the first time they heard of IS as a *tool for facilitating communication*, 27% said 'before high school' while 63% said 'during high school'. Asked when the first time was that they heard of IS *as a possible area of specialization*, 11% said 'before high school'; 55% said 'during high school', 31% said 'after high school'; and 3% said 'in college'.

4.3.7   IS Impressions

When asked about their impressions about IS as an area of specialization, having completed this course in *IS Concepts*: 1 (1%) said s/he did not find it so interesting; 19 (21%) found it rather interesting; 53 (71%) found it very interesting; 2 (3%) indicated the 'Other' category and specified: Importance in today's living styles for learned people; and Very innovative, interesting and well paying profession.

4.3.8   IS Specialization

When asked whether if they had the opportunity to change their choice of specialization, they would consider choosing IS: 35 (47%) said 'Yes'; 19 (25%) were 'Not Sure'; while 21 (28%) said 'No'.

4.3.9   Retrospect

The respondents were asked whether at the time of choosing their area of *specialization*, if they had known then what they now knew about IS, and if a Bachelor of IS (BIS) option was available, if they would have chosen BIS as an area of specialization: 28 (37%) said 'Yes'; 30 (40%) said 'Not really'; 14 (19%) said 'No'; while 3 (4%) said this question was not applicable to them.

4.3.10   Bachelor of IS

The respondents were asked if, in their opinion, there should be offered a Bachelor of IS (BIS) (equivalent to Bachelor of Economics (B.Econ) specialization at the Joint Admissions Board (JAB) level: 66 (88%) said 'Yes'; 2 (3%) said 'Not really'; 2 (3%) said 'No' and 5 (7%) said the question was not applicable to them.

5.   SURVEY DATA ANALYSIS

5.1   **Personal Information**

As a nation, Kenya is striving to achieve fair gender representation in all aspects of its operations, be it public or private sector, and in its political and social endeavours. A 71% male against a 29% female class representation, therefore, comes close to, but still falls short of, conformity with existing national policies and guidelines of 67% against 33% male vis-a-vis female representation. The age dispersion among respondents of between 18 and 23 years of age was expected among the JAB intake of students admitted directly from high school into the KPUC 'regular programme' from the different years between 2008 and 2010. The survey results show that the mean (and mode) age upon JAB admission into the university college in 2011 was 20 years of age.

5.2   **Education**

Kenya's current education system is popularly known as the 8-4-4 system, introduced in the early 1990s, which means that there are eight years of primary and intermediate school education, four years of secondary school education, and four years of university education. This system was preceded by a 7-4-2-3 system, which was in turn preceded by an 8-4-2-3 system. There are two major differences between the current and the two previous systems of education. The first difference is elimination of 'High School' ('A' Level) education, a two-year period between secondary school and university education. The second difference is prolonging the university period by one year, from three to four years. From the survey results, we found that 96% of the respondents had completed ordinary 'O' Levels (the Kenya Certificate of Secondary Education (KCSE)) while 4% had completed 'A' Level education. Although the public education system in Kenya no longer offers 'A' Level education, a few private schools still offer it. Moreover, some Kenyan parents still send their children to other countries, such as the United Kingdom and Uganda, to obtain 'A' Level education. What is not clear is how 'A' Level students got into the JAB selection process.

Due to change to the 8-4-4 system, the country found itself unable to absorb all students graduating from secondary schools into its university system immediately upon graduation. As a result, university intakes have lagged behind, sometimes by as many as five years, as is evident from some respondents who undertook their 'O' Level education in 2005 but were not able to join the university college until 2011. This notwithstanding, it is worthy of note that a student admitted into university education through the JAB system might defer reporting due to extraneous circumstances such as ill health. The KPUC September 2011 intake consisted mostly of students who finished their secondary education in 2009. A large majority of the students who took part in the survey obtained their education in Kenya, which allowed them to be selected by JAB for admission into the public university system.

The KPUC September 2011 intake was skewed towards students who undertook their secondary education in the Central Province of Kenya, at 28%, against all of the other provinces, especially the Western Province with only 4% of the intake. Others were 7% in the Nairobi Province; 8% in

the Eastern Province; 9% in the Nyanza Province; and 15% in the Rift Valley Province; while 29% did not respond to this question. It is plausible that the relatively larger intake from the Central Province is a reflection of the level of access to secondary education in that province relative to the other provinces of Kenya. Failure to respond to this question (29%) might be attributed to sensitivity to regional issues found among the cultures of the peoples of Kenya.

5.3   **Specializations**

As at the time of the survey in December 2011, only three different specializations within the School of Business and Management Studies had admitted students at the degree level, namely: the Bachelor of Commerce, Bachelor of Economics, and the Bachelor of Business Information Technology. Intake into the *Bachelor of Commerce* programme in September 2011 had 98 students, being the second degree level intake into that programme, the first intake of 96 students having been done in January 2011. A total of 30 students were admitted into the *Bachelor of Economics* class of September 2011, being the first degree level intake into that new programme. A total of 25 students were admitted into the *Bachelor of Business Information Technology* class of September 2011, being the first degree level intake into that new programme. Other specializations within the School into which degree students would be recruited in the next few semesters were the Bachelor of Science in Accountancy, the Bachelor of Technology in Office Management Technology, and the Bachelor of Art in Legal Studies.

For purposes of administering and facilitating the degree programmes in their first year of admission, the large *Bachelor of Commerce* class of 98 was divided into 'A' and 'B', each consisting of 49 students. The *Bachelor of Commerce 'A'* group was combined with the *Bachelor of Economics* group to form one class of 79 students, while the *Bachelor of Commerce 'B'* group was combined with the *Bachelor of Business Information Technology* group to form a class of 74 students. The group that took part in this survey was the *Bachelor of Commerce 'A'* group that was combined with the *Bachelor of Economics* group to form one class of 79 students. The survey was conducted in one of the two sections of the *IS Concepts* class. In the survey results, 46 (61%) of the respondents indicated *Bachelor of Commerce* as their area of specialization while the other 29 (39%) indicated *Bachelor of Economics* as their area specialization.

5.4   **Concentrations**

The *Bachelor of Commerce* specialization at KPUC has the following eight different areas of concentration: Accounting, Finance, Insurance, Business Administration, Entrepreneurship, Supply Chain Management, Human Resource Management, and Sales & Marketing. In the survey results, 31% of the respondents indicated Accounting as their area of concentration; 16% Finance; 3%) Insurance; 5% Business Administration; 3% Entrepreneurship; 3%) Supply Chain Management; while 1%) did not respond to this question. The percentage of respondents to this question of 62% corresponds to the percentage of *Bachelor of Commerce* students who took part in the survey. It is noteworthy that the Human Resource Management and Sales & Marketing concentrations were erroneously omitted from the questionnaire as possible options of concentration under the *Bachelor of Commerce* specialization.

5.5   **Other Training**

It has been a long time practice in Kenya for parents to encourage and pay for their secondary school graduate children to attend capacity building trainings while they await KCSE results. This practice has more recently been boosted by the prolonged time lag between the release of KCSE examination results and university intake – that now stands at approximately 24 months - but that has sometimes been as long as 5 years since the change to the 8-4-4 system. The researchers in this study were interested in capturing this information to determine how many of the respondents

took part in other trainings concurrently with their university education. Asked whether they were undertaking any other trainings either at KPUC or outside KPUC concurrently with their current university education at KPUC, 44% said 'Yes', 55% said 'No', 1% did not respond to this question. Asked to provide additional information on the training, they gave the following responses: 11 (15%) were undertaking Stage I of the CPA accreditation; 8 (11%) Stage II of the CPA accreditation; 6 (8%) Stage III of the CPA accreditation; 3 (4%) Stage IV of the CPA accreditation; 3 (4%) ICT accreditation (Stage 'n/a'); 1 (1%) Stage I of the ACCA accreditation; 1 (%) was undertaking accreditation in various Accounting packages; while 42 (56%) were either not undertaking any trainings or were doing so for other accreditation not provided as options on the survey form.

Those who were not currently undertaking any other training(s) in addition to their university education were asked to give reasons why they might have chosen not to do so. They provided the following responses: Financial constraints 26 (35%); desire to give priority to degree program 10 (13%); distance from KPUC to the desired training facilities 2 (3%); lack of information on the trainings 1 (1%); while 4 (5%) did not respond to this question.

5.6   Information Systems Awareness

It is worthy of note that at KPUC, *Information Systems* is not among the eight concentration options within the *Bachelor of Commerce* specialization. Whether by commission or omission, the reason(s) for this are of particular interest to these researchers, although not the central focus of the current study. It can be safely assumed, however, that KPUC does not perceive IS as an important or significant arm of commerce. As already pointed out, the focus of this study was informed by the presupposition that many business students are not aware of IS as a possible area of study. The study, therefore, sought to investigate the level of IS awareness of the students and to determine at what point in their education careers they obtained such awareness. Asked when the first time was that they learned of IS as a tool for facilitating communication, 27% said 'before high school'; 63% 'during high school', while 11% indicated 'after high school'. Asked when the first time was that they learned of IS as a possible area of specialization, 11% said 'before high school'; 55% 'during high school', 31% 'after high school'; and 4% 'in college'.

5.7   Impressions of Information Systems

It was apparent that a large majority of the students in this particular section of the *IS Concepts* course was getting exposed to IS in a fundamental way, for the first time. Since a great number of the students were showing keen interest in and a few even seemed enthusiastic about the subject matter, it was important to find out what impressions had been made upon them during this particular course. Asked about their impressions about IS as a field of specialization, having completed the *IS Concepts* course, a majority of the respondents 53 (71%) indicated that they found IS to be 'very interesting'; 16 (21%) found it 'rather interesting'; 5 (7%) did not give their impressions; while only 1 (1%) 'did not find it so interesting'.

5.8   Choice of Current Specialization

Asked to give any special reason(s) for the current choice of specialization, 16 (21%) said it was a lifelong passion or dream; 10 (13%) gave perceived career/job opportunities as the primary reason; 8 (11%) said it was a future career goal; 11 (15%) gave talent/skills match as the primary reason; 18 (24%) gave interest in or passion for the general area of business as the primary reason; 8 (11%) gave desire to change the world (and/or Kenya) as the primary reason; while 5 (7%) gave reasons that fell under the 'other' general category.

5.9   **Change to IS Specialization**

There was a need to find out if, having obtained a better understanding and appreciation for IS through the *IS Concepts* course, some students might consider changing their field of specialization to IS, if given the opportunity. Only 21 (28%) of the respondents were sure they would **not** change to IS specialization given the opportunity to do so. The remaining 54 (72%) indicated that given the opportunity, they might change to IS specialization (35 (47%) 'Yes' and 19 (25%) 'May be/not'). Of those who indicated they would change to IS specialization if given the opportunity, 50 (66%) said their main reason for doing so would be their interest in the subject matter, while 25 (34%) said they would do so due to perceived career opportunities in the subject area. Of those who indicated that even if given the opportunity they would **not** change to IS specialization, 64 (85%) said they would **not** change to IS specialization because they have passion for their current specialization, 9 (12%) indicated that they did not understand IS enough to make the decision to change, and 2 (3%) said they had no interest in the subject matter.

Those who indicated that if they had the opportunity to change their choice of specialization they *would* choose IS specialization were asked why they would consider IS as an area of specialization and were asked to select all options that apply to them. 12 (16%) indicated 'Perceived career opportunities'; 23 (31%) 'Interest in the subject matter'; 9 (12%) 'Good salaries'; 41 (55) 'Other' with each indicating that the question does not apply to them; 1 (1%) 'It is the tool that is driving the globe'; 1 (1%) 'The passion for managerial post'; and 1 (1%) indicating 'Growing level of technology'. Those who indicated that if they had the opportunity to change their choice of specialization they *would not* choose IS were asked why they would not consider IS as an area of specialization and were asked to select all options that apply to them: 1 (1%) indicated 'It does not interest me'; 3 (4%) 'I still don't understand it enough'; 22 (29%) 'I have a passion for current chosen specialization'; and 49 (65%) indicated 'Other'.

5.10   **Retrospect**

The *IS Concepts* course just completed by the students was assumed to have provided new information and created increased awareness about career opportunities in IS and its role in the country's economic development agenda. Under this assumption, there was a real possibility that some of the respondents would want to change their choices of specialization in retrospect. With this in mind, the respondents were asked whether at the time of choosing their area of *specialization*, if they had known then what they now knew about IS, and if a *Bachelor of IS* degree option had been available, if they would have chosen *IS* as an area of specialization. 28 (37%) said 'Yes'; 30 (40%) said 'Not really'; 14 (19%) said 'No'; while 3 (4%) did not respond to the question.

5.11   **Bachelor of Information Systems**

With the students' new found knowledge of and appreciation for IS, the researchers wanted to find out if the students would recommend installation of a specialization (degree) in IS at KPUC. The respondents were asked if, in their opinion, there should be offered a *Bachelor of Information Systems* degree specialization equivalent to the *Bachelor of Economics* specialization at KPUC at the JAB level. 88% said 'Yes'; 3% 'Not really'; 3% 'No' and 7% said the question was not applicable to them.

5.12   **Policy on 'Specialization' in Kenya**

It was observed that in the current public university education system in Kenya, once a student has been assigned to an area of specialization, either by his/her own choice or by the JAB, it is almost impossible to change it. The respondents were then asked what their impressions were

about this policy and to *select all options that apply to their opinions.* 3 (4%) said 'It works well for everyone'; 53 (71%) 'Students ought to have the opportunity to change their minds'; 38 (51%) 'Students ought to be given more time to think/choose'; 26 (35%) 'Students are forced to choose too early'; 3 (4%) 'It does not make much of a difference' and 1 (1%) chose 'Other' and specified that the question did not apply to him/her.

5.13 Policy on 'Specialization' elsewhere

It was observed that in other university education systems, such as in the United States and Canada, a university student is allowed to change his/her area of specialization at any time during his/her university education. The respondents were asked what they considered to be the advantages and disadvantages of this kind of policy framework, and to *select all options that apply to their opinions.* 52 (69%) said 'It allows students to adjust wrong choices'; 47 (63%) 'It gives students more time to think/choose'; 25 (33%) 'It is too convenient'; 4 (5) 'Many students would find it unnecessary'; 3 (4%) 'It does not make much of a difference'; and 1(1%) indicated 'Other' and specified that this question was not applicable to him/her.

6. DISCUSSION

The focus of this study was informed by the pre-supposition that many Kenyan university business students might not be aware of IS as either a possible field of specialization or concentration. The study intended to establish the level of IS awareness among the students using two different measures: a) 'early' vis-à-vis 'late' and b) 'low' vis-à-vis 'high'. The point in time in their education careers when they became aware of IS as a possible field of specialization was used as the **first proxy** for IS awareness level, which was considered 'early' if before high school and 'late' if during or after high school. The following assumptions were made: early awareness of IS as a field of specialization increased the chances of its selection; and the earlier the awareness, the better the chances of choice. The study was able to establish that only 11% of the respondents became aware of IS as a *possible area of specialization* before high school, which was considered early awareness, while 55% of the respondents became aware of IS during high school, 31% after high school, and 4% became aware of it in college. Learning about IS as a field of specialization during or after high school was considered late awareness. From these responses, only 11% of the respondents obtained early IS awareness while the other 89% obtained late IS awareness.

The point in time at which a student learnt of the existence of IS as an area of specialization, its utilization in the real world, its career opportunities, and its strategic importance to the country's economic development agenda was used as a proxy for 'high' IS awareness level, the **second proxy**. Using these proxies, the study found that low levels of IS awareness existed before taking the *IS Concepts* class while high levels of IS awareness was obtained after taking the *IS Concepts* class. Survey questions presupposed high levels of IS awareness since the questionnaire was administered after completing the IS Concepts course. The fact that only 1% of the respondents did not find IS interesting upon completing the *IS Concepts* course was used as a clear indication that the majority found it interesting. With 71% of the respondents indicating that they found IS to be very interesting and 21% indicating that they found it rather interesting, the study found that the proportion of respondents that found IS interesting at some level was 92%. Given these results, it could be argued that the *IS Concepts* course not only made a strong impression on a large number of the students but also increased IS awareness as a possible area of specialization.

With only 28% of the respondents certain that they would **not** change specialization if given the opportunity and the other 72% leaving open the possibility that they could change to IS

specialization if given the opportunity, chances that the *IS Concepts* course created both increased interest and increased awareness exist. In fact 66% of the respondents were specific that the reason they would change to IS specialization would be interest in the subject matter, while 34% were specific that their reason would be perceived career opportunities. It can thus be argued that the *IS Concepts* class influenced the respondents by providing a more fundamental understanding of the subject matter and by allowing them to perceive other advantages such as its utilization in the real world, its career opportunities, and its strategic importance to the country's economic development, all of which were identified in the study as constructs of high IS awareness levels.

Retrospectively, only 19% of the respondents were emphatic about their lack of desire to change to IS as a field of specialization. The other 79% might have chosen IS as a field of specialization had they known earlier what they now knew about IS. Part of the significance of this particular finding is the possibility that the *IS Concepts* course was an 'eye opener' into the specialization of IS, providing information that was not otherwise available earlier to this group of students as they were making career choices. This, in-turn, supports the argument that the course provided a high level IS awareness as a field of specialization. In essence, if the students had the opportunity to change their specializations, after completing the *IS Concepts* class, a large majority would have changed to the *Bachelor of Information Systems* degree or to a closely related specialization.

It is worthy of note that Commerce as an area of specialization, is the most popular (and, therefore, most competitive) with secondary school graduates in Kenya compared to other areas of specialization. As a case in point, the May 2012 intake for the *Bachelor of Commerce* degree at KPUC stands at 125 students against other specializations throughout the University College that stand at about an average of 30 to 40 students. Different students choose this area of specialization for different reasons. Asked to give any special reason(s) for the choice of the *Bachelor of Commerce* specialization, 21% said it was a lifelong passion or dream; 13% gave perceived career/job opportunities as the primary reason; 11% said it was a future career goal; 15% gave talent/skills match as the primary reason; 24% gave interest in or passion for the general area of business as the primary reason; 11% gave desire to change the world (Kenya) as the primary reason; while 7% gave reasons that fell under the 'other' general category. This question was asked to both *Bachelor of Commerce* and *Bachelor of Economics* students and therefore, their responses are lumped together and are indistinguishable.

7. CONCLUSIONS

The study speculated, a *priori*, that both late and low levels of IS awareness as a field of specialization can negatively impact the choice of IS as a field of specialization and by extension, IS education in terms of the number of students that select it and ultimately join existing programs. Obtaining IS awareness before joining high school was considered early in the study, whereas obtaining IS awareness during or after high school was considered late. The data analysis shows that eleven percent (11%) of the respondents obtained early but low level IS awareness in terms of the number of students. The fact that a large majority of the respondents did not learn of the existence of the specialization, its utilization in the real world, its career opportunities, and its strategic importance to the country's economic development until they took the *IS Concepts* course at the university college is also proof of low IS awareness level. The data analysis also shows that eighty-nine percent (89%) of the respondents obtained IS awareness late, as defined in the study, but high IS awareness in terms of the number of students. The study concluded that IS awareness as a field of specialization among Kenyan university business students is both late (in time) and low (in number of students). In addition, IS awareness obtained by the respondents before taking the *IS Concepts* class was found to be low, while IS awareness

obtained in the *IS Concepts* class was found to be high. The study was thus able to establish late IS awareness and low IS awareness level among the respondents.

After the *IS Concepts* course, ninety-two percent (92%) of the respondents found the subject to be interesting at some level, with seventy-two percent (72%) of them leaving open the possibility of changing to IS specialization if given the opportunity. The fact that the *IS Concepts* course made such a positive impression on these students may point to the need to provide more and better career choice information to students during and before they leave high school. It also points to the importance of expanding both specialization choices and concentration options that include *Information Systems*, to the JAB admission process level. Due to similarities in many of the influencing factors in the study within Kenyan universities and university colleges, it is possible to infer the results of this case study to the entire Kenyan university system.

8. RECOMMENDATIONS

Further studies using the same data set as this one are suggested, including the following:
   a) A study to investigate the relationship between Information Systems (IS) awareness among Kenyan university students and the choice of IS as a field of specialization, using statistical tests such as correlation analysis (e.g. Alpha or Pearson) to support any such relationships.

   b) A study to try to establish an association between IS awareness levels and IS choice levels and to infer an association between IS choice levels and IS education levels. Such a study should ride on the findings of the current study to establish whether the fact that Kenyan university business students get only low level IS awareness before joining college, does in need <u>not</u> allow them to make IS specialization choices, and how this impacts on IS education levels in the country.

   c) Other studies that look more closely at the following possible areas of interest:
   • Re-visit the underlying assumptions regarding the level of IS awareness as a field of specialization among Kenyan university business students;
   • Attempt to establish an association between levels of choice of IS as a field of specialization and levels of IS education in the country;
   • Attempt to establish an association between levels of IS education and levels of systems analytical skills in the field of IS;
   • Examine the potential impact of low levels of IS awareness on the choice of IS as an area of specialization;
   • Examine the potential impact of choice of IS as an area of specialization and levels of IS education; and
   • Examine the potential impact of levels of IS education on availability of systems analytical skills.

   d) A study comparing the point in time of IS awareness as a field of specialization between Kenyan university business students and those of other countries. The objective of such a study would be to compare IS education in Kenya with those of other countries. The results of such a study would inform, not only whether there are significant differences between IS education in Kenya vis-à-vis other countries but also possible reasons for any such differences.

e) A study applying a model from the FOUR posits specified in the current study (student awareness, utilization in the real world, career opportunities, and strategic importance to the country) to the Choice of a Field of Specialization.

f) A study investigating the correlation between students' expectation on the knowledge they want to acquire with the knowledge they actually acquired from the specific IS related program they enrolled in, in Kenyan Universities.

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APPENDIX A:

Description of Respondent Characteristics

A questionnaire was administered to one of the two *IS Concepts* sections of the September 2011 intake at the Kenya Polytechnic University College (KPUC) in Nairobi. The class section consisted of 75 students made up of 46 *Bachelor of Commerce* students (61%) and 29 *Bachelor of Economics* students (39%). The students were part of the new intake being Year I, Semester I degree students. The *Bachelor of Commerce* students were part of the second intake while the *Bachelor of Economics* students were the first intake at the degree level since the inception of KPUC as a University College in November 2008 (the first *Bachelor of Commerce* degree intake was in January 2011). For facilitative reasons, the September 2011 *Bachelor of Commerce* class of 98 students was divided into two groups (*'A' and 'B'*), each consisting of 49 students. *'A'* was then combined with the *Bachelor of Economics* September 2011 class of 30 students, and *'B'* was combined with the *Bachelor of Business Information Technology (BBIT)* September 2011 intake class of 25 students. The *IS Concepts* course was offered to all new degree students in two sections of one class – the first one consisting of *Bachelor of Commerce 'A' and Bachelor of Economics (ABMI 1121: ICT Concepts, Section I),* a total of 79 students; and the second one consisting of *Bachelor of Commerce 'B' and BBIT (ABMI 1121: ICT Concepts, Section II)*, a total of 74 students. The two sections were taught by two different lecturers. The group that participated in this survey was the combined *Bachelor of Commerce 'A' and Bachelor of Economics* with 79 students, although only 75 students participated in the survey. Of the 49 *Bachelor of Commerce 'A'* students in Section I, only 46 took part in the survey, and of the 30 *Bachelor of Economics* students in Section I, only 29 took part in the survey.

Issues relating to IS awareness as a field of specialization were considered applicable to both *Bachelor of Commerce* and *Bachelor of Economics* students. The survey instrument was administered in the final week of instruction, the 12th week of the semester, along with the last continuous assessment test (CAT), and was assigned 5% of the total 30% CAT marks. Participation in the survey was the only condition for earning the full credit of 5%.

APPENDIX B:

The Joint Admissions Board (JAB)

Public Universities (in Kenya) and their constituent colleges conduct a joint admission exercise to their universities under a common framework called the Joint Admissions Board (JAB). This is mainly to ensure access to university education, based on academic merit for institutional-based undergraduate students. Students admitted through JAB get funding from the government. This admission exercise is performed annually before the start of each academic year, for candidates who sat the KCSE examination the previous year. JAB comprises representation from all public universities and the Ministry of Education.

There are three levels of authority in the JAB. At the top level is the *Committee of Vice-chancellors*, responsible for ensuring that all policies and procedures are followed, in addition to dealing with difficult ad-hoc admission cases. The Ministry of Education representatives participate at this level to ensure that national policies are incorporated into the JAB decisions.

The second level is the *Deans Committee* that comprises deans/directors of faculties/ schools/institutes in the respective public universities. It is the deans who receive the output of the JAB system and accept the qualified students in their respective faculties/schools/institutes. The deans also make recommendations on various policies, procedures and matters that are pertinent to the admission process.

The third level is the *JAB Secretariat*, a combination of bureaucrats and ICT technical staff who run and maintain the JAB information system as well as administering the JAB process.

APPENDIX C:

Kenyan Public Universities and Their Constituent Colleges (represented in the JAB)

1. University of Nairobi
2. Kenyatta University
3. Egerton University
4. Moi University
5. Maseno University
6. Jomo Kenyatta University of Agriculture & Technology
7. Masinde Muliro University of Science & Technology
8. Kimathi University College of Technology
9. Mombasa Polytechnic University College
10. Pwani University College
11. Kenya Polytechnic University College
12. Kisii University College
13. Chuka University College
14. Narok University College
15. Meru University College
16. South Eastern University College
17. Bondo University College
18. Kabianga University College
19. Multimedia University College of Kenya
20. Laikipia University College
21. Kiabanga University College
22. Karatina University College
23. Chepkoilel University College
24. Taita Teveta University College
25. Muranga Unversity College
26. Kirinyaga Unversity College
27. Cooperative Unversity College
28. Kibabii Unversity College
29. Garissa Unversity College
30. Rongo Unversity College
31. Embu Unversity College
32. Machakos Unversity College

APPENDIX D:

Survey Instrument
ICT Concepts Class (B.Com. A and B. Econ), September 2011

This survey instrument is administered in this **ICT Concepts** class in lieu of one class assignment, and is assigned a weight of 5 total points.

Instructions

Your responses to the survey questions on this survey instrument are highly valued - as they will help provide the global ICT community with some information on ICT education in Kenya. So, please take the survey seriously, giving each question due consideration and providing the best possible answer to each. Pay careful attention to the instructions for each survey question. A total of 5 possible points will be assigned to each satisfactorily completed survey instrument. Do not put your name (nor student ID) on the survey instrument. However, be sure to sign today's class attendance sheet in order to get full credit for the survey. You have 30 minutes within which to complete the exercise.

1. **Personal Information**
   a) 1) What is your Gender? ____Male   ____Female;
   b) What is your *year* of birth?   _____
   c) What are some of your hobbies?
      I.   _____
      II.   _____
      III.   _____

2. **Education**
   a) What is the highest education level you attained before joining the University College?
      ____'O' Level;   ___ 'A' Level;   ____Other: Specify _____
   b) What year did you complete 'O' level education? _____
   c) What year did you complete 'A' level education (if applicable)? _____
   d) What year did you complete 'Other' education (if applicable)? _____

3. **'O' Level Education**
   a) In which **country** did you undertake 'O' level education? _____
   b) If Kenya, in which **province** did you undertake 'O' level education? _____
   c) If Kenya, in which **county** did you undertake 'O' level education? _____
   d) What is the name of your 'O' level education school? _____
      _____

4. **'A' Level Education**
   a) In which **country** did you undertake 'A' level education? _____
   b) If Kenya, in which **province** did you undertake 'A' level education? _____
   c) If Kenya, in which **county** did you undertake 'A' level education? _____
   d) What is the name of your 'A' level education school? _____
      _____

5. **'Other' Education**
   a) In which **country** did you undertake 'Other' education? _____
   b) If Kenya, in which **province** did you undertake 'Other' education? _____
   c) If Kenya, in which **county** did you undertake 'Other' education? _____
   d) What is the name of your 'Other' education school_____
      _____

6. Current (University) Education

a) What is your area of *specialization (select one)*?
____Bachelor of Commerce (B. Com.)
____Bachelor of Economics (B. Econ.)

b) Give any special reason(s) for your choice of this *specialization*:

----

c) If B. Com., what is your choice of *concentration (select one)*?
___ Accounting;
___Finance
___Insurance
___Business Administration
___Entrepreneurship
___Supply Chain Management

d) If B. Com., give any special reason(s) for your choice of this *concentration*:

----

7. Other Trainings

a) A part from your current university education at KPUC, are you undertaking any other trainings either at KPUC or outside KPUC: ____ Yes   ____ No;

b) If 'Yes', please provide additional information on the training:
   i.   ___ CPA certification; Stage _____
   ii.   ___ICT certification; Stage_____
   iii.   ___ACCA certification; Stage_____
   iv.   ___Other certification; Stage_____
   v.   If 'other' please specify: _____

c) If 'Yes', what are the start and end dates of your trainings:
   i.   _____   Start date: _____   End date: _____
   ii.   _____   Start date: _____   End date: _____
   iii.   _____   Start date: _____   End date: _____
   iv.   _____   Start date: _____   End date: _____

d) If 'No', please give any reasons why you might have chosen not to undertake any other training(s): _____
_____

8. Information Communication Technology (ICT) awareness
   a) When was the first time you heard of ICT as a tool for facilitating communication?
      i.   ___Before high school
      ii.   ___During high school
      iii. ___After high school
      iv.   ___Other
            (Specify:_____).

   b) When was the first time you heard of ICT as a possible area of specialization?
      i.   ___Before high school
      ii.   ___During high school
      iii. ___After high school
      iv.   ___Other
            (Specify:_____).

9. Information Communication Technology (ICT) impressions
   c) Today, having completed this course in *ICT Concepts*, what are your impressions about ICT as an area of specialization?
      i.   ___Not so interesting
      ii.   ___Rather interesting
      iii. ___Very interesting
      iv.   ___Other
            (Specify:_____).

10. Information Communication Technology (ICT) specialization
   a) If you had the opportunity to change your choice of specialization, would you consider choosing ICT? ____Yes ____Not Sure   ____No

   b) If 'Yes', why would you consider ICT as an area of specialization *(select all that apply)?*
      i.___Perceived career opportunities
      ii.___Interest in the subject matter
      iii.___Good salaries
      iv.___Other
            (Specify:_____).

   c) If 'No', why would you **not** consider ICT as an area of specialization *(select all that apply)?*
      i.___It does not interest me
      ii.___I still don't understand it enough
      iii.___I have a passion for current chosen specialization
      iv.   ___Other
            (Specify:_____).

11. Retrospectively
   a) At the time of choosing your area of *specialization*, if you knew then what you know now about ICT, and if a Bachelor of ICT (B. ICT) option was available, would you have chosen B. ICT as an area of specialization?
      ___Yes   ____Not really   ___No

   b) At the time of choosing your area of *concentration* (for B.Com. students), if you knew then what you know now about ICT, and if an ICT option was available, would you have chosen ICT as an area of *concentration*?
      ___Yes   ____Not really   ___No

12. Bachelor of ICT
   a) In your opinion, should there be offered a Bachelor of ICT (B. ICT.), (equivalent to B. Econ.) specialization at KPUC at the Joint Admissions Board (JAB) level?
   ___Yes   ____Not really   ___No

13. Policy on Specialization in Kenya
   a) In our current university education system, once a student has been assigned to an area of specialization, either by his/her own choice or by the JAB, it is almost impossible to change it. What are your impressions about this policy *(select all that apply)?*
   I.   ___It works well for everyone
   II.   ___Students ought to have the opportunity to change their minds
   III.   ___Students ought to be given more time to think/choose
   IV.   ___Students are forced to choose too early
   V.   ___It does not make much of a difference
   VI.   ___Other
   (Specify:_____).

14. Policy on Specialization elsewhere
   a) In other university education systems, such as in the US and Canada, a university student is allowed to change his/her area of specialization at any time during his/her university education. What do you consider to be the advantages and disadvantages of this kind of system *(select all that apply)?*
   I.   ___It allows students to adjust wrong choices
   II.   ___It gives students more time to think/choose
   III.   ___It is too convenient
   IV.   ___Many students would find it unnecessary
   V.   ___It does not make much of a difference.
   VI.   ___Other
   (Specify:_____).

15. Thank you!
   Thank you for taking part in this survey. If you would like to receive the results of the survey, please provide your e-address here: _____