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Effect of Procurement Lead Time on Teaching and Learning at the University of Health and Allied Sciences

by

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DECLARATION

I hereby declare that this submission is my own work towards the MSc Procurement Management and that, to the best of my knowledge, it contains no material previously published by another person, nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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ABSTRACT

This study was conducted to determine the effects of procurement lead time on teaching and learning at the University of Health and Allied Sciences. Consistent delays in the provision of goods in public universities create a less than optimal environment for effective teaching and learning. The study aims to examine the various factors that influence procurement lead time and their effects on teaching and learning. Using a purposive sampling technique, questionnaires were used to collect data from teaching staff, non-teaching staff and students. It was found from the study that the number of inventory turns per year at the university was less than 5 times and that the average procurement lead time is over a month. It was further found that stock out occurs once a month in the University. It was also found that factors that affect procurement lead time in the university of Health and Allied Sciences are; the adequate knowledge of Ghana's Procurement framework, the ability to design unambiguous procurement specifications, Staff motivation and top management support, Effective supplier selection and the adequate and timely release of funds to the procurement unit. It was found that major supplies to the university are from local and foreign manufacturing companies which indicate a relationship with the private sector. Enhanced procurement lead time ensure goods availability and ensure on time delivery and better suppliers performance. Enhanced procurement lead time reduces inventory costs and creates a better supply chain management system in the university. Analysis of collected data suggests: Keeping to Ghana Procurement regulations, Outsourcing non-essential/Non-core services and other such initiatives are valid strategies for improving procurement lead time. In conclusion, proper coordination between stakeholders is required to ensure effective supply chain systems. It is recommended that Call-Off Contracts with Suppliers be used as well as the implementation of E-Procurement and Electronic Reorder Systems.

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DEDICATION

I dedicate this work to my father, Mr. Randolph Korzie Sambo for his belief in me and to Mr. Ben Beke who set me on the path of procurement management.

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I would like to express sincere appreciation and gratitude to the faithful God, through whose divine graces, mercy, guidance, protection and strength, I have been able to pursue and undertake this project research.

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LIST OF ACRONYMS

BSc	Bachelor of Science
DLT	Delivery Lead Time
ERP	Enterprise Resource Planning
GDP	Gross Domestic Product
GNDP	Ghana National Development Program
HR	Human Resource
ICT	Information Communication Technology
JIT	Just – In - Time
MIS	Management Information Systems
MLT	Manufacturing Lead Time
MO	Manufacturing Order
MOE	Ministry of Education
MSc	Master of Science
NAB	National Accreditation Board
OF	Order Fulfilment
OHLT	Order Handling Lead Time
PO	Purchase Order
PSM	Purchasing and Supply Management
RT	Real - Time
SC	Supply Chain
SLA	Service Level Agreement
SCM	Supply Chain Management xiv

SLT	Standard Lead Time
TP	Time Pressure
SPSS	Statistical Package for Social Science
UHAS	University of Health and Allied Sciences
UIS	UNESCO Institute for Statistics

CHAPTER ONE

GENERAL INTRODUCTION

1.1 Introduction

According to (Shann et al. 2013),Africa has one of the lowest education completion rates in the world. It is therefore imperative that the few who are able to have access to University education be given every assistance to ensure continued personal and national development. Data from the UNESCO Institute for Statistics (UIS) supports this assertion (Global et al. 2015). This fact is well appreciated by successive Ghanaian Governments hence the effort to establish at least one public university in every region of the country as well as the upgrade of all polytechnics to degree awarding institutions.

In fact UNICEF defines quality education to include a dimension that environments that are healthy, safe, protective and gender-sensitive, and provide adequate resources and facilities need to be present to ensure effective teaching and learning. The Organization goes on to say that processes through which trained teachers use child-centered teaching approaches in well-managed classrooms and schools and skillful assessment to facilitate learning and reduce disparities make up another dimension to quality education(Series et al. 2000). One theme that runs through these definitions is the need to have in place the physical infrastructure, the educational materials and equipment needed to engage and train the minds of young adults and also create the environment for effective research.

In all these efforts aimed at ensuring that opportunities are created to increase access to tertiary education, the question remains whether or not these educational inputs and the financial resources to provide them are available to sustain this vision. In it's Education

Strategic Plan which spans the year 2010-2020, the Ministry of Education intends to increase equitable access to high quality tertiary education that provides relevant courses to young adults within Colleges of Education, Polytechnics and Universities, and for research and intellectual stimulus (Ministry of Education, 2010). It however remains to be seen if this is achievable within the constraints of funding, infrastructure and educational inputs.

1.2 Background

The University of Health and Allied Sciences established by an Act of Parliament (ACT 828 of December 2011) as a public university in Ghana. The main campus including the central administration is in Ho. A second campus is located in Hohoe with a planned establishment of the School of Pharmacy in Keta (UHAS, 2016). The University is also involved in vocational training of its students which involves students being posted to health facilities situated in the entire Volta Region. The University of Health and Allied Sciences admitted its first batch of students in September of the following year with a student number of 155. The number students admitted in 2015 was well over 1,200.

The University has the following strategic goals, Vision and Mission:

- Institute curricula and pedagogy that are practical and relevant to our national health needs and aspirations.
- Provide solutions to community and environmental health problems through research and outreach programmes.
- Foster professional and personal competence, growth and success of staff and students.

- Promote partnerships with health institutions, nationally and internationally, in the public as well as in the private sector, to improve community health. (UHAS, 2016)

Vision:

- A pre-eminent research and practically oriented health educational institution dedicated to community service (UHAS, 2016).

Mission:

- To provide quality educational opportunities to students and healthcare professionals, advance knowledge through scholarship and research and provide patient care and services that improve health and quality of life.
- To provide an avenue to train different health professionals needed to attend to the health needs of the citizens. (UHAS, 2016)

The educational delivery system operated by the University is composed of a four year term of undergraduate study and two year terms for studies at the masters' level. A typical academic calendar is composed of a trimesters. The first and second are the taught portions of the academic calendar with the third being dedicated to vocational training dubbed Community Service by the University at the various District Health Centers and Hospitals. This is an effort put in place to ensure that the various communities have access to health care professionals and to provide hands on training to students.

Education is a process that facilitates learning, or the acquisition of knowledge, skills, values, beliefs, and habits (Wikipedia, 2016). Educational methods can include storytelling, discussion, teaching, training, and directed research. Education can take place in formal or informal settings and any experience that has a formative effect on the

way one thinks, feels, or acts may be considered educational. The methodology of teaching is called pedagogy.

Ghana's tertiary institutions enroll over 300,000 students in undergraduate, graduate, certificate and diploma programs in a full range of academic and professional fields (State, 2016). The National Accreditation Board (www.nab.gov.gh) lists 140 accredited institutions, both public and private, offering four-year degrees as well as two and three-year diplomas, which are not equivalent to Bachelor's degrees, but undergraduate transfer credit can be awarded (State, 2016).

The term education system generally refers to public schooling, not private schooling. Schools or school districts are typically the smallest recognized form of "education system" and countries are the largest (Reform, 2013). An education system comprises everything that goes into educating public-school students. Educational systems as earlier mentioned employ diverse delivery systems. Formal methods include teacher-students environments in enclosed settings such as classrooms and laboratories. The definition of 'environment' in the teaching field however, has evolved tremendously. Physical environments have been replaced by online interaction platforms; curricula have been fashioned into Massive Open Online Courses (MOOCS) that rely heavily on telecommunication infrastructure. It is in this regard that the University has endeavored to present a system that ensures comprehensive hands on experience. It is worth noting that research forms a vital base of the University's operations with involvement in Ebola and malaria trials in the Upper Volta region of Ghana.

Such as exercise carried out each year for developing Institution adds to the pressure to ensure that procurement lead times are adhered to in order have available all the

requisite materials for a successful programme. Lead time is an essential part of the supply chain management in these operations. It is a definitive measure of the effectiveness and efficiency of any supply chain in an organization and therefore provides an avenue to test these parameters in the Institution. Essentially lead time refers to the period or timeframe within which a process is started and when it's outcome(s) are received. Organizations strive to reduce lead times and lead time variability in order to achieve competitive advantage and maintain a continuous flow of goods, services, information and cash. (Treville et al. 2014) further argued Lead-time reductions allow the order decision to be made based on an updated demand forecast.

1.3 Statement of the Problem

Educational inputs in the form of goods, infrastructural works and services are required by the University to carry on its various programs and activities. This is coordinated between the user units, the Procurement Office and the Works and Physical Development Directorate (in the case of physical infrastructure). The challenge is the delivery of these inputs at the times that they are required. It is reported and generally known that inputs (goods) required for effective teaching and learning is often delayed or unavailable upon request.

Educational delivery systems are diverse. They can be in forms of print, audio, video, face to face student lecturer interaction or a combination of these (Lehman, 2016). These inputs are required due the nature of the methods employed by the University. Inability to ensure the presence of these inputs at the times they are needed may have negative effects on educational delivery. Various actors and stakeholders are involved with the

process of acquiring the inputs and it is unclear the level of coordination that exists or the effects therewith.

Section 21 of the Public Procurement Act, 2003, Act 663 and PPA Amendment Act 914 requires Procurement Entities to prepare a procurement plan for each fiscal year and prepare quarterly updates for approval by the Entity Tender Committee. Chapter 3 of the accompanying manual to Act goes further to state the various lead times for the different methods of procurement allowable under the law. This is to ensure that procurement is planned and executed to ensure that orders are received within the time frame that they are required(PPA, 2003). The University being publicly funded is bound by these laws and regulations. However difficulties with funding, as identified by (Duwiejua & Newman 2016), are inadequate to implement procurement plans. Increased numbers of educational facilities and a rising student population hamper Government effort to pay for goods, works and services on time for efficient teaching and learning (Duwiejua & Newman 2016).In this regard, the Institution funds most operational inputs using internally generated funds and in some cases physical infrastructure as well while awaiting Government allocation.

A number of studies have been conducted into the effect of lead time on delivery systems over several industries. (Fang et all, 2013) for example found that benefits from improving demand or supply processes, which includes lead time, are greater for firms with non-optimal inventory policies (in practice, this may refer to firms that manage their inventories without standard policies, or by ad hoc decision making) than for firms that manage their inventories optimally. This implies a correlation between improvement in lead time and organizational effectiveness.

Other research suggests that industry has focused on speed as the basis for competitive advantage. (Ray & Jewkes 2003) produced analysis which shows that the time-based competitive strategy for firms whose customers are more sensitive towards price than delivery time will be different from firms whose customers want shorter delivery time and is ready to pay a price premium. This can be translated to the scenario in which organizations have to choose between greater lead time variability and higher unit costs.

In adopting a vocational and research approach to tertiary education, the University has placed itself at the fore front of education in Ghana. It is therefore a microcosm that can be analyzed and expanded to represent educational systems prevalent in tertiary institutions of the country,

The study will therefore seek to explore the effects of factors such as funding, staff competency and performance; Institutional procedures among others have on procurement lead times and by extension, the effect of lead time on teaching and learning in order to shed greater light on the variables involved in decision making with regards to lead time of educational inputs.

1.4 Aim of the Study:

The aim of this research was to examine the various factors that influence procurement lead time and their effects on teaching and learning at the University of Health and Allied Sciences.

1.5 Specific Objectives of the Study:

In order to achieve the research aim, the following objectives were undertaken:

1. To determine the average procurement lead time for goods.
2. To determine the factors that affect the procurement lead time.
3. To determine the effect of the estimated procurement lead time on teaching and learning
4. To determine strategies to improve procurement lead time.

1.6 Research Questions

To realize the objectives stated above, the following research questions were asked:

1. What is the average procurement lead time for goods?
2. What are the factors that affect procurement lead time?
3. What is the effect of procurement lead time on teaching and learning?
4. What strategies can be adopted to improve on procurement lead time?

1.7 Significance of the Study

The study was aimed at identifying the factors influencing lead time in the University of Health and Allied Sciences and going further to analyzing the effects of procurement lead time on educational delivery. Significant investment is made in the setting up of the University, it is therefore imperative that it be protected by ensuring its sustainability and value for money in terms of the training of quality health personnel. Research by (Abugla, 2015) into procurement lead time in the Ghanaian Health industry using the case study approach found that efficient management of the procurement function results

in an efficient lead time management regime. It was the hope of this research to replicate the methodology in the University set up and to compare results.

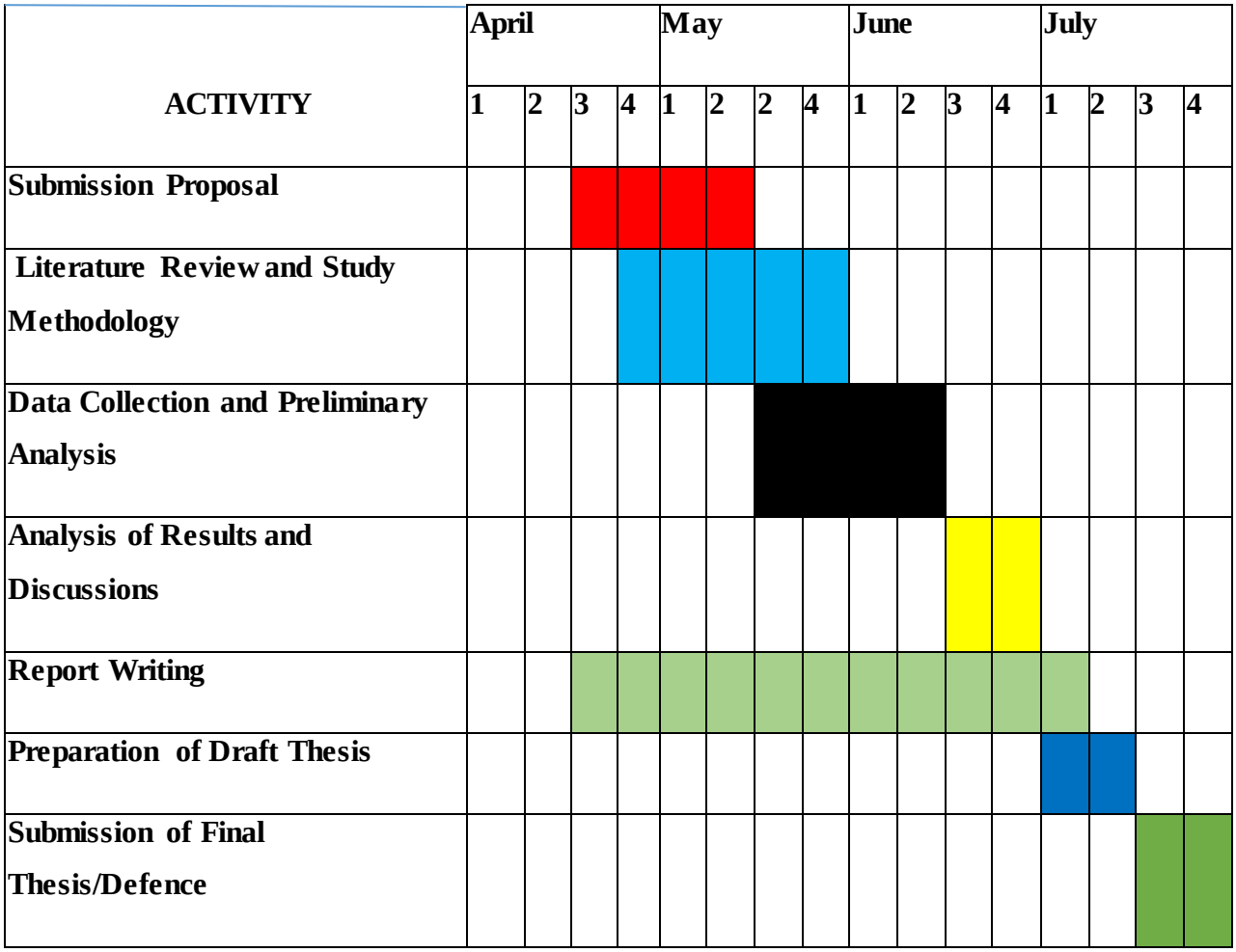
It also afforded management of the Institution the opportunity to identify bottlenecks in the procurement process and take corrective measures to ensure timely procurement. The interactions between stakeholders such as the Procurement Unit, Works and Physical Development Directorate, the Finance Directorate, the Internal Audit Directorate, the University General Administration, end user units and Sellers were looked at to identify their respective roles in procurement lead time.

1.8 Scope of Study

This research work was carried out under the broad context of procurement management in a public institution. It however narrowed into a lead time investigation using the University of Health and Allied Sciences as a case study. In terms of categorization, the procurement of goods was studied. The scope was narrowed to procurement activities for the 2014/2015 academic year.

The timeline for undertaking the study is detailed below:

Figure 1.1: Time Schedule for conducting case study



1.9 Report Outline

The research consists of five chapters. Chapter one comprises of the introduction, the background of the study, the statement of the research problem, the study's objectives, the research questions, scope and the significance of the study.

Chapter two comprises of the literature review which examines the conceptual and theoretical aspect of procurement systems in general. There is a close examination of education systems, their deliverables in terms of effective teaching and learning. Logistics management was looked at in relation to lead time in public sector administration.

Furthermore, the research methodology was looked at in chapter three, in which the data collection and presentation procedures will be examined It outlines the various aspects of operational work associated with the research. The research design, population and sample sizes, as well as quality control measures was looked at.

Chapter four focuses on analysis of the data collected based on the responses from the respondents. The data obtained from the respondents were analyzed using descriptive statistics indicating the mean values, standard deviation which were then be used to determine the significance of each factor with regard to respondents' membership information. ANOVA tables were also be used to determine significance of variables which have responses based on a likert scale. Chapter five forms the concluding part of the study and includes recommendations and suggestions on effective procurement lead time management in an educational environment.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Chapter two focuses on reviewing the literature on procurement lead time and its associate variables such as supply chain management, classification and components of lead time, factors influencing lead time, lead time effects, bottlenecks and challenges of public procurement and the development of a conceptual framework for the study. It also attempts the exhibit the empirical theories that form the basis for the quantitative aspect of the research.

2.2 Procurement Concept

The procurement concept has been defined in many ways. (Mcdermott, 1993) suggest in his research that it is, in terms of infrastructural works, the acquisition of new buildings, or space within buildings, either by directly buying, renting or leasing from the open market, or by designing and building the facility to meet a specific need. This definition is expandable to goods as well as consultancy services. In his book, "Procurement Systems; A cross industry project management perspective"(Garvin, 2009) suggests that procurement systems encompass the various strategic and tactical decisions, make/buy, outsourcing and insourcing decisions that have an effect on promoting the value chain of the client. Procurement by inference refers to the act of obtaining or buying goods and services. The process includes the following stages; preparation and processing of a demand as well as the end receipt and approval of payment. It often involves purchase

planning, standards determination, specifications development, supplier research and selection, value analysis, financing, price negotiation, making the purchase, supply contract administration, inventory control and stores, and disposals and other related functions. Some functions can e omitted depending on the activity at hand.

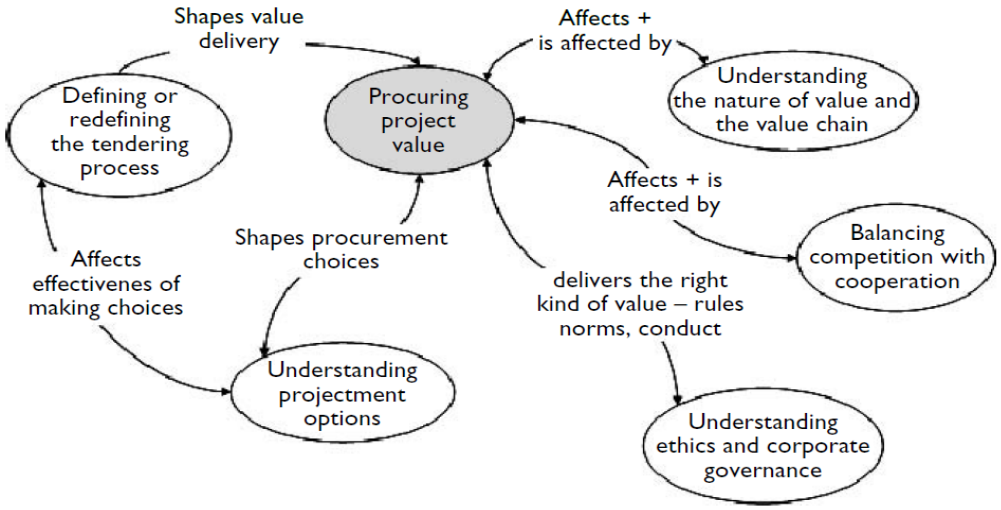


Figure 2.1: Various interrelationships between functions in the procurement system(Walker & Rowlinson n.d.)

2.2.1 Public Procurement

Public procurement refers to the agreement or contracts provided (for financial gain) by public buyer (contracting power) or a utility (elements working in the water, energy, transport and telecommunication sectors) to a seller (Musau 2015). Public procurement makes up a larger portion of a nation's total expenditure and with most nations having strong legislative instruments detailing the procedures for the award of contracts (Musau 2015).

(Bovis 2008) defines Public procurement as the procurement of goods and services on behalf of a public sector entity. As inferred from (Musau 2015) string legislative instruments exist which set up oversight boards and delegates responsibilities. It serves

to ensure accountability and transparency in the procurement process. Procurement represents up to 20% of the Gross domestic product in least developed nations, Public procurement represents a high proportion of the worldwide economy (Bovis, 2007). Public procurement regulations involve every sector the public sector and supply contracts entered into by a public sector entity in dealing with the private sector(Bovis 2008).

2.2.2 Procurement Procedures

Shaw (2010) identified in her case study of procurement in the City of Austin that the process of procuring products and services can be categorized to three main phases. These are identification of needs, planning specifications and soliciting for suppliers, contract award and management. Procurement incorporates the entire procedure of purchasing property and/or services. It is initiated when a need is identified and a firm commitment made on the fulfilling of that need. Procurement proceeds through the risk management, assessing various options, contract award, delivery of and payment for the property and/or services and where necessary, the continuous administration of an agreement and consideration of options related to the contract.

Procurement stretches out to a transfer of property toward the end of its useful life (Waters, 2004). This casts a look on the total cost of ownership (Waters, 2003). Proper public acquisition arrangements and practices are among the key components of good governance (Ngugi n.d.). Inefficient procurement strategies serves as the avenue through which high amounts of public funds are wasted and misappropriated.

2.2.2.1 Need Identification

Needs identification refers to the process or scenario whereby an organization or user department recognizes a shortfall or absence of an input that if procured would lead to better organizational effectiveness.

2.2.2.2 Planning and Specification of Goods or Services Required

The next stage of procurement involves creating a plan that communicates and informs all parties on the strategies of delivering the needed items (Musanzikwa 2013). The plan is often developed in collaboration with all functions, departments and units of the firm so that a complete integration with the firm's overall strategy is achieved (Shaw, 2010). Descriptive, functional and performance specifications are given by the user agency or in extreme cases outsourced to an expert to define the correct nature of the item/service to be procured.

2.2.2.3 Seller Solicitation, Contract Award and Management

Sourcing (solicitation strategies) refers to the process of determining supply sources that can meet both the organization's current and future needs for products, works and services (Hunsaker 2009). The sourcing strategy chosen will be based on several criteria. Issues such total life cycle cost, maintenance and parts replacement as well as product life will be critical in making a decision. Emergency situations for example are provided for in most procurement guidelines. It provides for shorter procedures and timelines so as to readily relief the situation.

The steps in the sourcing procedures include the following:

2.2.2.3.1 Market Survey

This is the process of taking quotes from sellers. Short evaluations are carried out based on the organization's guidelines and procedures below certain thresholds. It can also be used to prepare and analyze internally generated estimates (Shaw, 2010).

2.2.2.3.2 Evaluation and Awarding

The evaluation of tenders leads to the provision of contracts to qualified sellers. This phase is critical because it is the stage at which information is verified and a determination made about the ability of sellers to perform to requirements (Maurer, 2004). Procurement Units embark on the following activities on this regard:

1. Analyzing and assessing the offers pre-agreed standards, specifications, requirements and introducing the analysis to procurement appointed committee;
2. Verifying the capacity of suppliers
3. Evaluating and reviewing the results of product scrutiny where required
4. Verifying key reports where needed
5. Negotiating with suppliers on key cost areas as and when necessary
6. Placing the order and facilitating prompt delivery (Maurer, 2004).

2.2.2.3.3 Order Placement and Contracting

In granting tenders, the following steps in the process includes putting requests for the items with the selected suppliers and or creating formal contracts which are then delivered to the suppliers (Shaw, 2010). Components of an agreement or contract should comprise cost, design, delivery schedules, quantities and other salient terms and conditions which clearly shows rights and responsibilities of both parties to the contract (Shaw, 2010).

2.2.2.3.4 Progressing and Expediting

This forms part of the post contract stage. It involves constant monitoring, check –ups and follow-ups to ensure that sellers keep to terms of the contract and deliver as scheduled, within specifications and budget (Bovis, 2007; Shaw, 2010).

2.2.2.3.5 Delivery and Return

Researchers such as (Lewis and Roehrich, 2009) argue that the procurement function helps in the delivery process through helping is delivering items on time and resolving all issues in relation to the delivery times. It is crucial at this stage to ensure that goods are inspected prior to acceptance to ensure that they conform to specifications (Shaw, 2010).

2.2.2.3.6 Payment

Payments are made to sellers to upon the completion of work or on pre agreed terms and conditions. In works contracts, payment certificates are issued according to the terms of the o contract. Other contracts are also paid out according to project milestones. Audit processes are critical to ensure that there is limited risk of fraud. Finance departments are responsible to payments after verification and auditing.

2.2.2.3.7 Procurement Review and Evaluation

Procurement review is examination of the entire procurement process. It is to ensure that all guidelines and policies relating to procurement have been followed. It further clarifies whether of the procurement exercise has been met. Reviewing unearths how the procurement function was implemented and also rates the performance of the seller in

order to guide future decisions on what to do or not do in order to achieve procurement success Shaw, 2010.

2.3 Role of Procurement

Researchers such (Lewis and Roehrich , 2009) state that procurement is a forms a major part of supply chain management. The procurement function can impact the realization of organizational objectives based on strategy adopted. Procurement forms a large portion of total expenditure in most firms and is therefore critical to maintaining profitability and sustainable business.

Procurement works is the center of the supply chain of most firms since it facilitates in translating requests into actual products and to satisfy identified needs (Caldwell et al., 2009). (Caldwell et al, 2009) further argues that procurement serves three categories of users and these are the internal customers; programmes in responses to crises and ongoing programmes, and requesting for stocks for customers within the firm and the needs of programmes.

(Caldwell et al., 2009) concluded that there are three essential standards of procurement. The main and first principle is that of transparency which provides that all stages in the procurement procedure are fair and precisely recorded. The second principle is accountability and it brings up the need for accountability from donors and funding agencies who demand that items are procured based on established procedure. The last principle is that of efficiency and cost effectiveness which applies to the "6R" of ensuring that items procured are of the right quality, right source, right price, right quantity, right place and right time.

2.4 Supply Chain Management

The term supply chain is the process which integrates, coordinates and controls the movement of goods, materials and information from a seller to a buyer and on to the final end user (Emmet, 2005). Supply chain involves several activities spanning across buying/sourcing, making, moving and selling. The interplay between supply and demand in the creation of value for the customer sets up the basis for the supply chain. In this vein variants such as demand chain and value chain are used to represent the supply chain which in essence means the same thing (Emmet, 2005). The relevant of the supply chain is supported by (Juha and Pentti's, 2008) observation that procurement influences the accessibility, cost, quality of materials and additionally responsiveness and adaptability of firms in addressing client needs and desires.

2.4.1 Logistics Management

In as much as supply chain encompasses the logistics function, organizations have come to the realization that it is imperative to treat it with autonomy due to its central role in business operations. Research by (Song et al. 2000) supports this assertion and encourages strategic alliances in the management of the logistics function.

Logistics management is part of supply chain management. It plans, implements, and controls the efficient, effective forward, and reverse flow and storage of goods, services, and information between the source of goods and services and the point of consumption in order to meet customer's requirements. The complexities involved with logistics can be modeled, analyzed, visualized, and optimized by simulation software and statistical tools. The minimization and efficient the use of resources is central to the logistics team.

2.4.2 Lead Time

Lead and for that matter procurement lead time can be defined as the length of time between when an order is placed and when it is actually available to satisfy customer demand (Liao & Shyu 1991). Lead time is a major topic of discussion in inventory management and control. Proper management of lead time can result in higher customer satisfaction albeit at an additional cost(Liao & Shyu 1991).

2.4.3 The Concept of Procurement Lead Time

Lead time is frequently utilized diversely by authors, which is justifiable considering the scope of activities the term covers. Researchers (Christopher et al., 1979) and (Perry, 1990) argue that managing lead times to accomplish consumer satisfaction and loyalty as strategic and can help in gaining competitive advantage. He further argues that lead time frequently facilitates the identification of likely improvements in the use of the resources of firms.

According to (Kuhlang et al., 2011), lead time is the duration of time (hours, minutes, and so forth.) needed by any process to change the inputs (materials, customers, cash, data) into outputs (products, services). it is therefore the period between the commencement and completion of a specific procedure. (Tersine and Hummingbird ,1995) expressed that reducing lead time can be seen as accelerating the throughput of the material or data rather than cutting a part of the lead time it self. This view corresponds with those of other researchers. (Towill, 1996) named the term 'time pressure' (TP). He additionally expressed that streamlining the supply chain (SC) would enhance the time to market, or reaction time, by compressing lead times.

(Wedel,1996) suggests, a broad meaning of lead time incorporates the time taken to perform every function from the moment the request was gotten from the customer up to the moment the request has been satisfied. Generally, lead-time comprises functions such as planning manufacturing, assembling delivering of products and services. (Harland et al., 2009) outs it this way; lead time is extensive and covers key activities such as the time required in bidding for contracts, making awards, delivering the products as well as the time that elapses between when the request is made and when payment is made. (Silver et al., 2008) have also described lead time as the time that passes by between when the product requests are placed and the time that the items requested are received into stock and that when effectively done, an efficient lead time can impact positively or negatively on customer satisfaction depending how effective it is implemented by a firm and inventory costs. This is proven in service quality models used by researchers

2.4.4 Types of Lead Time

Lead time exists in several forms within the supply chain. In order get a clear understanding of the total concept, it imperative to briefly examine the several forms of lead time and their contribution to value addition. (Kuhlang et al., 2011), categorizes lead time as follows:

2.4.1 Order handling lead time (OHLT)

Order handling lead time is the time required from the minute of receiving a customer order (example by email or text) and ends when the order has been entered, completely processed into the enterprise resource management system and is confirmed (Rajaniemi, 2012). This kind of lead time relates to information flowing from upstream in the supply

chain (from purchaser to seller). It contains information about the delivery address, the request delivery date, products, quantities and prices. Additionally, it comprises order processing activities such as inventory check, inventory assignment, credit check, a check of the agreement and in the subsequently, returning back an order confirmation to the client (Naylor et al., 1999). According to Naylor et al., (1999) swift and accurate information from clients can lead to shorter information lead times and in addition material lead times. As indicated by Rajaniemi (2012), the ideal OHLT ought to be one day or less.

2.4.2 Delivery lead time (DLT)

Delivery lead time begins right at the time when the ERP system releases the order to the expedition unit until the moment of real delivery. The expedition unit is required to gather the right products and any other related materials and to create the documentation for shipment. The DLT can be decreased to a certain degree, principally by a reduction of the waiting time or non-value adding activities. The real transport time is generally static and relies on upon the distance to the client and selected transport methods. The OHLT and DLT are two lead times that affects the total duration of the Order Fulfillment (OF) process. Gunasekaran et al., (2004) call this process as order lead-time' or total order cycle time. Both OHLT and DLT can be measured through performance pointers that say something about service performance towards clients. According to Durlinger (2013) these two types of lead times determines the External Service Level (ESL).

OF = OHLT + DLT

2.4.3 Supplier lead time

According to (Gunasekaran et al., 2004), supplier lead time is the delivery lead time of the supplier contracted. It is the time in hours, minutes and seconds from the period when raw materials are ordered to the period when the ordered materials are received.

2.4.4 Manufacturing lead time

The manufacturing lead time (MLT) is the time from the minute a purchase order (PO) is sent and changed into a manufacturing order (MO), entered into the Enterprise Resource Planning (ERP) system, until the minute that the products are produced and are accessible to be purchased in the distribution center (Rajaniemi, 2012).

RT = SLT + MLT

ISL and ESL level represent the performance of the replenishment time and order fulfillment process. Assume that the ESL never fails; then the firm will also have a high ISL. On the other hand, the following will likewise apply. Assume the ISL is generally low because of the absence of product accessibility. This shows that the ESL will likewise be poor. This inevitably can bring about a low reaction time to the market

2.5 Lead Time Effects

(Ray and Jewkes, 2004) theorize that the costs of products and services and lead time are interlinked. From the perspective of demand side, lead time is said to have a positive effect in terms of the quantity required and the level of stock deemed safe enough to forestall stock outs (Vernimmen et al., 2008). This in effect implies that having long lead times leads to higher expenditures on safety stock as a result of tying up capital, oldness, defective items and higher warehousing cost (Christopher, 2004). Moreover, having

higher levels of safety inventory leads to a lower rate of inventory turnover, leading to locking up much needed capital and which inevitably delays the updating of products as well as reaching consumers on time (Christopher, 2004).

Another effect of lead-time is that, the lengthy lead-time makes it difficult for firms to coordinate and plan their operations and it also negatively affects cash flow since it locks up capital in the form of resources (Christopher, 2004). Additionally, the quantity of unplanned and rushed orders from suppliers goes up when longer lead time exists and this is because a higher percentage of orders will not be delivered as per schedule and this increases cost since request will have to be hurriedly done. In effect, a longer lead time leads to challenges in terms of creating a more receptive and responsive supply chain and thereby impeding the likelihood of meeting customers' requests promptly (Christopher, 2011; Stalk, 1988).

According to (Tersine and Hummingbird, 1995), a reduction of lead times ultimately leads to higher firm performance and the addition of value for customers. This again can lead to gaining competitive advantage in the highly competitive market of today. (Tersine and Hummingbird, 1995) is again of the view that a shorter lead time engenders the reduction of risks associated with ordering for products, enables firms to plan better, and overall, lead to trust among channel partners since there is reliability and dependability.

From the foregoing therefore, it becomes obvious that lead time is highly critical to the realization of corporate objectives and also meeting key performance indicators such increased customer satisfaction, internal customer satisfaction, employee motivation, channel partners' satisfaction, increased profitability, growth and sustainability of

businesses (Christopher, 2011; Lee et al., 2004; Ray and Jewkes, 2004; Tersine and Hummingbird, 1995; Stalk, 1988).

2.6 Factors Influencing Lead Time

(Kagiri, 2005) identified key factors influencing lead time to include inadequate knowledge on behalf of procurers, delays, insufficient planning, inadequate facilities and equipment, inadequate financial resources, poor motivation of employees, cumbersome bidding and tendering processes etc. Additionally (Lynch, 2004) has also identified influencing factors to be inaccurate estimates and forecasts, poor designs, late preparation of tender documents, inaccurate site information etc. According to (Thai ,2001), factors external to the firm that can affect procurement lead time may comprise the market environment, the legal environment, and the political, technological and social environments. However, the influence of these external factors may for instance depend on the number of suppliers, since a competitive environment may engender a more structured and transparent bidding and tendering processes while a monopolistic situation will call for using one supply which can be faster and less bureaucratic.

(Bartezzaghi et al. 1993) endeavored to develop a more extensive perspective of the factors that affect lead time generally and came up with some drivers that can impact on lead-time. These factors are:

1. Uncertainty is the level of knowledge of the input, the change activities and the output of a procedure, such as transmitting and changing forecast information by salesmen of partners and subsidiaries.

2. Execution pace of the resources. This can be seen as resource productivity indicator. This driver is regularly seen as the most critical driver, yet this does not imply that it has the best effect on lead-time.

3. Demand-capacity ration which alludes to the level of resource saturation

4. The location and layout of the resources influences the required time to process materials and exchange information. It can likewise be considered in connection with the area and distance from the suppliers and the exchange of information.

5. The level of parallelization of consecutive exercises that refers to the extent to which it is conceivable to execute activities in the same time, e.g., concurrently executing the required checks.

6. Leadership and problem solving attributes allude to the decision- making procedures and the level of negotiation of managerial decisions, level of delegation and precision of performance measurement systems. This factor can be related to the strategic, tactical and operational level.

7. Erratic flow is the level of unevenness of demand which is related to the unevenness of the procedure. This sporadic flow is identified with the load and transfer batch for the unevenness of process. This may bring about challenges with making a forecast.

8. Variety is a vague factor. From one viewpoint it identifies with the mix of products which utilize the resources of a specific procedure. Then again it alludes to the multifaceted nature of those products that can be measured by the number of parts and the number of distinctive technologies and subsystems of the output. This driver additionally refers to the variability of procedures in general.

9. Reliability of procedures and defectiveness. Process dependability can be seen as the likelihood that an object cannot be handled because of inadequate resources. The process reliability of an aggregate request is made up of several products and where one product is missing, it affects the reliability of the entire process. Defectiveness has to do with the likelihood that an object will not meet specifications.

10. Learning knowledge alludes to the experience picked up in reducing lead time by improving the effects of factors at a higher level such as leadership and critical thinking and problem solving abilities. This experience can be picked up by learning from different factors.

11. Connections can be depicted in three sections. To begin with, planning and control policies that direct the scheduling of activities and importance of resources used. Second, coordinating systems that identify the effect of organizational liaison devices on lead time. Third, the relations between the lead times of diverse activities. The last can be presented by means of a total lead-time model.

2.7 Improving the Procurement Function and Reducing Lead Time

Reducing lead time is very important. It is fundamental that organizations compare themselves and other firms to test that value for money is being accomplished, additionally as a feature of the procedure of looking for nonstop change and identification of good practice. This is frequently done through a benchmarking procedure (Maurer, 2004). The main role of benchmarking is to enhance the productivity of the firm by testing how it is performing, whether it is accomplishing better performance and the rate at which its performance is progressing. Again the procurement function should be consistently coordinated with other aspects of the

supply chain within the firm and this includes an effective warehousing and distribution function, astute financial management and efficient human resources management.

2.8 Empirical Review

Educational Technology creates changes in all aspects of human endeavour especially in training and research as it provide resources for trainers and researchers leading to comprehensive learning as well as extend the learning process Modes of educational delivery in modern time form the quintessence of the effectiveness of tutelage delivered.

In his essay, (Gilbert, 2013) includes suggestions for change – adapting delivery styles, using more of what is known about learning and learners, and denounces at holding too fast to tradition. Included are suggestions to break away from the stale approaches that may not work anymore and an examination/re-examination of some things that might yield results. This points to changes in educational systems and the need to ensure that inputs that go with such systems are available when required.

(Oyamo and Mburu, 2014) investigated the impact of procurement procedures in the distribution of pharmaceutical products in Kenya and found that sourcing plays a key role in quality health care delivery and that other vital component such as designs, planning and choice of suppliers. This may hold true for other sectors as the setup is similar administratively.

(Davis et al. 2009)observed that ICT integration does not replace the traditional practice in the classrooms; it only improves teaching and learning practices. The study of inputs such as these reinforces the effect of providing such inputs in an educational setting. Again (Davis et al. 2009) state that among the positive effects observed in the

classrooms were that students and lecturers' comfortability and high proficiency in ICT use in teaching and learning, formal and informal students and lecturer interaction. Slow internet connection, power outage, inadequacy of facilities and distraction by ICT are some of the challenges noticed. Availability of internet service, software and other facilities, good ICT skills of both students and lecturers, and students' participation were recorded as part of the incentives available while blend of approaches (traditional and ICT based) was the form of integration observed.

(Agbugbla, 2015) in his research into the effects of procurement lead time on health care delivery found that developing good relationship with suppliers, keeping to public procurement regulations, motivating employees, outsourcing and training employees in the procurement and supplies function improves lead time in public procurement.

2.9 Conceptual Framework

This study adopts the framework used by (Agbugbla, 2015) to operationalize the study's objectives. (Agbugbla, 2015) attempted to identify the impact of procurement lead time on health care delivery on a district hospital by using four main variables namely – specification design, procurement planning and contracting and supplier selection.

2.8.1 Specification design

Specifications are essential to ensure that needs identified are adequately met according to prevailing legal frameworks. Designing and meeting the right specification entails having employees with the requisite expertise and experience or where unavailable outsourcing such activities (Oyamo and Mburu, 2014).

2.8.2 Procurement Planning

(Royer, 2003) states that in arranging or planning distribution systems to facilitate the maximization of procurement function while reducing total expenditure, it is essential that firms give maximum attention to all aspects of the system. Procurement Planning is essential to establish lead times and ensure that there is adequate funding to support the procurement process.

2.8.3 Contracting

Contracting or outsourcing is using providers external to the firm in supplying essential items to the firm (Royer, 2003). It is the result of a solicitation and evaluation procedure that ensures that a firm capable of performing the work at hand is selected.

2.8.4 Supplier selection

(Oyamo and Mburu, 2014) state that choosing the right suppliers can help procurers take care of the buyer's demand for higher quality medical and laboratory supplies while additionally meeting high regulatory benchmarks. Similar assertions can be made in the case of education as both sectors are involved with administration in regards to large numbers of people.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The research followed the theory established by the Contextual Constructs Theory (Knight et al. 2012) which infers a construct and a cognitively driven approach. That is, the research will find ways to build abstracted constructs that are used to represent or describe the phenomena being investigated. These constructs are described in language, words that come to represent phenomena that may have existed long before the initiation of the research but are nonetheless necessary to establish a reference point from which to proceed(Knight et al. 2012). The research context associates entities surrounding the research in this case the University under study, the phenomenon of lead time being investigated and its associated elements along with previous study carried out on the subject matter (Knight et al. 2012)

This research was biased toward the positivism philosophy, which is based on the justification that true and valued knowledge is valid knowledge (Navarro Sada & Maldonado, 2007). The research is based on the triangulated or mixed approach.

3.2 Research Methods; Definitions and Arguments

The term methodology refers to ways in which problems are approached and problems solved (Taylor, et al., 2015). There seems to be no concordance with the definition of research, (Amaratunga et al., 2002) state that the disagreement stems from the fact that every research has a different meaning to the researcher involved, as well as meaning differently to diverse classes of people and organizations. (Amaratunga et al.

2013)summaries from the various definitions available, that research is a process of enquiry and investigation, that it is systematic and methodological; and leading to an expansion of knowledge.

The dual schools of thought with regards to research begin with logical positivism which uses quantitative and experimental methods to test hypothetic generalizations(Amaratunga et al. 2013). The other school of thought ,interpretive science approach, focuses on the belief that generalizations can be made from a finite set of events in the past to predict future occurrences (Amaratunga et al. 2013).

.3.3 Quantitative and Qualitative Research Methods

Research has two main classifications. They are qualitative and quantitative and fit into the broad spectra of the schools of thought regarding research. Qualitative methods focus on the wording and observations regarding the subjects in order to describe reality (Amaratunga et al., 2002). Quantitative methods however, are derived from academia and places trust and emphasis on figures on which opinions and concepts are formed.

Debate has raged over the last two decades over the strength and weakness of either qualitative or quantitative research approaches. The make-up of the definition regarding these methodologies differ from author to author. There is however agreement on the fundamentals of the divergence between the two and their implications for research (Amaratunga et al. 2013).

It is argued that findings of qualitative enquiry remain tentative as long as they are untested (Hyde, 2000). This view is held even though both qualitative and quantitative research both practice deduction ad induction. It is believed that the adoption of formal deductive techniques represent a step forward in assuring conviction n qualitative

analysis(Hyde, 2000). Enter then the realm of mixed methods research. Mixed methods research is the integration of qualitative and quantitative methods within a single study or a set of closely related studies. This approach will be relevant in investigating procurement procedure and lead time along with their consequences on learning and teaching at the University of Health and Allied Sciences.

3.4 The Research Design

Choosing the appropriate research design is a critical early decision a scholar has to make when crafting a study (Brooks & Normore ,2015). It helps the scholar to examine the who, what, when, where, how and why issues related to the study and can be seen as a road map or blueprint for the project (Brooks & Normore 2015)

Research design refers to the nature and manner in which data, information, responses, populations and samples are coordinated in the conduct of research. There is no unique approach to research. Most scenarios require a case by case examination to determine the right approach which would yield best results.

According to researchers, such as (Neuman, 2007), a research design as a plan for selecting sources and the nature of information to be used in answering research questions. The research design is to establish the connection existing among different variables of the research. It lays out steps from the formulation of the hypothesis to the final analysis of the collected empirical data.

Having established the focus of the research as the effect of procurement lead time on teaching and learning, it is necessary to engage stakeholders in the university of Health and Allied Sciences to properly investigate the subject matter. Stakeholders such as top

senior management, heads of academic departments, student leaders, administrators and user departments would be interviewed to generate the required data for analysis.

In this regard, the required approach to use would be the case study. This allows the University to be used as a closed environment providing pristine data which can then be extrapolated to cover other institutions and governmental organizations.

3.5 Types and Sources of Data

There are several research methods and techniques which could be employed in the gathering of information for the study. The study by it's nature involved the collection of organized and logical data and comparing with legislative procedures. Thus, the survey method was used because the research demanded information from the several departments and user organizations within the University. The notion in the use of the survey method in this research is to make sure that any later research or analysis of the attributes of the population sampled will be precise and also the findings and results can be standardized globally. Thus data was collected from all relevant sources, secondary (journals, periodicals, textbooks, websites, etc.) and primary sources in the form of questionnaires.

3.5.1 Primary Research Data

Data refers to basic values or facts. The term 'data' is considered plural in the scientific community. The data to be collected for this study was gathered through the survey approach to aid in interpretation. Data was collected from stakeholders and other relevant personnel in the University environment. Most of the questions asked in the study were closed ended. However, some of the information will be through the use of opened ended questions.

Closed ended questions will be used because it allows for answers within a set and is used to gather factual information such as age, gender or opinions. This allows for a greater degree of control for the researcher over the questionnaire (Yin, 2003). Control I essential to ensure consistency and standardization which enables for drawing comparisms between. It also allows for analysis using statistical software and other statistical methods. It is also well known that close ended questions reduce fatigue and therefore assist in gaining a high response rate.

3.5.2 Secondary Research Data

Secondary data for this study is already available in some contexts. The secondary data sources for this study includes published articles, books, reports and studies related to the subject area as well as internet sources. These sources are used in the literature review chapters to develop the arguments that serve as the basis for the empirical study and also give a theoretical context for the work done.

3.6 Population of the Study

Population refers to the total collection of element about which some inferences are made. The population of this research is senior management of the University, deans, heads of department and student leaders such class representatives.

3.6.1 Target Population

In the light of the fact that this is a case study under investigation, staff that were deemed relevant to the study were targeted. Departments that are central to the performance of procurement activities such as Finance and Administration, Works and Physical Development and the Procurement Unit itself was the main focus of attention.

3.7 Sampling and Sampling Procedure

Researchers such as (Neuman, 2007) define a sample as the percentage or fraction of the population that answers the research question. The reasons for performing surveys is to enable the researcher extrapolate from the sample to the population that the hypothesis regarding attitudes and behaviors can be made. It is therefore of prime importance the way and manner in which respondents are selected for surveys in case studies.

3.7.1 Non Probability Sampling

The researcher adopted the purposive sampling type. Respondents will be selected specifically based on the fact that they have the background and relevant pieces of information that matters to the study.

3.7.2 Sampling Size

The sample size of this study will be one hundred key and relevant officials of the University. This sample size was drawn from a total population of about four hundred staff (400). It is envisioned that teaching staff will be interviewed along with no-teaching staff who are involved with the day-today running of the institution. Additionally, student class representatives will also be included in the interviews to garner their opinions as they are responsible for requesting for student aids and represent the larger student body.

3.8 Administration of the Research Instrument

Three ways are available in the collection of data- observation, direct communication (through interviews and questionnaires), and the thirdly through using secondary data

(Pizam, 1999). Two of three categories (direct communication and use of secondary data) were used for this project.

Invariably there will be frustrations in getting the necessary co-operation for the purpose of data collection. To mitigate this, the researcher will personally administer the questionnaires on the employees of the University. The researcher used a non – probability sampling technique in order to ensure a fair and accurate sampling procedure.

Fieldwork to collect the data for this study will take two weeks. After the brief explanations of the relevance and objectives of the study, the interviewers will be given given the questionnaires and given a week to complete.

3.9 Processing and Analysis of Data

Analyzing and interpreting research data is the quintessence of research. Defining the analytical method is vital to any research strategy (Amaratunga et al, 2002). The essence of analyzing the information from the research questions is to summarize the data in such a way that it both answers the stated research questions and as well as meet the research objectives. The data was analyzed in both descriptive and quantitative forms such using frequency tables, percentages etc. The datasets so collected was then coded and translated to an SPSS (Statistical Package for Social Science) and Microsoft Excel.

In using SPSS, factors were coded as variables and responses recorded according to these variables. Using multiple regression methods, analysis was conducted to determine the mean, stand deviations and significance of each variable according to the groups of sections required. The results when ranked in order of decreasing significance to determine the weight or impact of each variable.

CHAPTER FOUR

ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter discusses data analysis, findings and their implications. The data was collected through the survey method. Due to the spread out nature of the University in terms of the location of campuses, internet tools such as google forms were used to provide greater access to the University population. The data gathered is presented in various sections of this chapter.

4.2 Sociodemographic Information

This section of the study focuses on assessing the background information of respondents. The socio demographic information of the respondents discussed include their academic and professional qualifications, the number of years they have worked with the hospital and their standing within the University community as either students or staff.

Table 4.1: Sociodemographic Data of Respondents

Socio Demographics	Frequency	Percentage
Membership Information		
Student	25	30.86
Teaching Staff	17	20.98
Non-Teaching Staff	39	48.14
	Frequency	**Percentage**
Academic & Professional Qualifications		
BSc/HND	36	44.44
MSc/MBA	20	24.69
Other	25	30.86
Number of years worked with the University		
Less than 5 years	58	71.60
5-10 years	15	18.51
10 years +	8	9.87

Source: Field Survey, 2016

The demographic distribution showed in Table 4.1 indicated that out of eighty-One respondents twenty-five (30.86%) were students, seventeen (20.98%) were teaching

staff and thirty-nine (48.14%) were non-teaching staff. A further breakdown of demographic information indicated thirty-six (44.44%) had BSc or HND qualifications, twenty (24.69%) had MBA/MSc or other such qualifications, twenty-five (30.86%) had other qualifications which will invariably be students. Fifty-Eight respondents (71.60%) had less than 5 years' experience, fifteen respondents (18.51%) and eight respondents (9.87%) had above 10years work experience. This distribution speaks to educational background of the respondents and their ability to understand the issues under discussion and draw comparisons with other institutions and industries where they may have worked before.

4.2.1 The roles of respondents within the University

The roles of respondents varied in the distribution. Student leaders such as members of the Student Representative Council and class representatives were interviewed. Teaching staff such as lecturers, research assistants and instructors were also interviewed. Finally, staff in supportive roles such registrars, administrators and other senior staff were also interviewed. The table below shows this distribution in more detail.

Table 4.2: Major Roles of Respondents in the University

Position	Frequency	Percentage %
Director	1	1.23
Supply/Procurement Manager	1	1.23
Lecturer	17	20.98
Senior Staff	37	45.67
Student	25	30.86
Total	81	100.00

Source: Field Data (2016)

Table 4.2 shows the distribution in terms of roles of individuals within the University community. Majority of respondents were senior staff who are directly involved in procurement processes. Students made up 30.86% of the distribution. Class representatives are instrumental in getting feedback on effects of lead time on learning. They are also directly responsible for requesting for educational inputs. Teaching staff represented 20.98% of respondents interviewed and were crucial on determining the impact of lead time on teaching. A director and supply chain manager were also interviewed as part of the survey. They provided insight into the procurement process employed thee university. They also provided perspective on the internal workings of the University. The cumulative effect of interview the diverse group of respondents was that a clear picture was formed on the procurement practices in the University and its resultant effects on teaching and learning.

4.3 The Average Procurement Lead Time for Goods Supplied to the University

This section addresses the conception of lead time for goods supplied to the University. It was based on literature espoused in chapter two of this study that indicated lead time to be the period from which a request was made to the point which the order is delivered to the customer. Customer, in this sense referring to students, faculty and staff who need inputs in order to teach or study as the case may be.

4.3.1 The sources of Goods Supplied to the University

Respondents were asked to give information on the most reoccurring of sources for goods supplied to the University. It was found that 51% of goods supplied were sourced from local and manufacturing companies. 28% of goods were also discovered to be from vendors, 7% from manufacturer's representatives and 11% from the Ministry of Education and other such agencies. This indicates that the University is not overly

reliant on the central government for inputs. The data also suggests a greater interaction with the private sector in the provision of goods to the university. This is a positive indication that suggests that there is self-reliance inbuilt in the University system that can be improved for the benefit of the institution. However there exists a danger in assessing the quality of suppliers with such a large percentage of sourcing done from the private sector Table 4.3 gives further breakdown of the data collected.

Table 4.3: Sources of Goods Supplied to the University

Source	Frequency	Percentage %
Local and Foreign manufacturing Companies	41	51
vendors	23	28
Manufacturer's Representatives	6	7
Ministry of Education	9	11

Source: Field Data (2016)

4.3.2 The Number of Inventory Turns per Year within the University

Respondents were queried on the inventory turns per year. Junior members of the University were asked the number of times in which they requested for the same items. The data collected suggested that 51% experienced less than 5 inventory turns per year. 11% experienced between 5-10 inventory turns per year with only 7% experiencing inventory turns greater than 10 in a year. This clearly suggests that the University involves itself in bulk purchases which are good for achieving economies of scale. However there is the lingering question of increasing holding costs. Table 4.4 gives a breakdown of the data collected.

Table 4.4: Number of Inventory Turns per Year

Number of Inventory Turns	Frequency	Percentage %	Valid Percentage%	Cumulative Percentage%
Less Than 5 Times	41	51	51	51
5 – 10 Times	9	11	11	62
Above 10 Times	25	31	31	93
Other	6	7	7	100

Source: Field Data (2016)

4.3.3 The Average Procurement Lead Time for Goods Supplied to the University

The average procurement lead time was asked of respondents in the survey. It emerged that 11% received their orders within a week of requesting for them. 36% received their goods within 1-4 weeks after requesting for them. A high percentage, 42%, responded that it took over a month to receive goods. The diverse nature of the results suggests that some items were easily sourced either by framework arrangements or other such processes for essential items. The high percentage of items that take over a month to deliver remain a source for concern and represent an area that needs to be addressed. Table 4.3.3 puts this in greater detail. It was also found that that no respondents ever received inputs before they were required. It suggests that procurement planning has not been effectively carried out by the university as required under legal regulations. 33% of respondents also stated that they received goods always just on time. This is in stark contrast with 47% who stated that goods were always delayed and 10% who responded that sometimes items were not supplied at all. The data presents a picture which portrays an inconsistency with the supply off goods to the University. Further work is therefore

required to harmonize systems and ensure that all goods required are delivered on time to meet objectives. Table 4.5 details these occurrences.

Table 4.5: Average Procurement Lead Time for Goods Supplied to the University

Time Frame	Frequency	Percentage %	Valid Percentage	Cumulative Percentage%
Less Than a Week	9	11	11	11
1 – 4 Weeks	29	36	36	47
Over a month	34	42	42	89
Other	9	11	11	100

Source: Field Data (2016)

Table 4.6: Incidence of Delivery of Goods to the University

Incidence of Delivery	Frequency	Percentage %	Valid Percentage %	Cumulative Percentage%
Always before time	0	0	0	0
Always just on time	27	33	33	33
Always delayed	38	47	47	80
Sometime Never Supplied	8	10	10	90
Other	8	10	10	100

Source: Field Data (2016)

4.3.4 The Frequency of Stock-outs in the University

When asked about the frequency of stock-outs in the University, 9% of respondents stated that they experience this daily, 22% stated that they experience this weekly, 32% stated that they experience stock-outs about once a month and 30% stated that they experience no stock-outs at all. Again this data suggests an inconsistency with the delivery of goods. It further indicates there is inefficiency in the way and manner in which reorder points are determined resulting in intermittent stock-outs. Table 4.6 details the data.

Table 4.7 details they manner in which respondents believe that the University calculates reorder points. It shows that 70% of respondents stated that reorder points are calculated by employees of the institution. This represents a human system that is unfortunately fallible and can well be the root cause of delays in the procurement process. Information management between partners in SCM is essential and should be accompanied by management information systems such as Just –In-Time (JIT), Enterprise resource Planning (ERP), social media, internet and web services for communication between partners. The adoption of such systems will prove more efficient than relying on human intervention.

Table 4.7: Incidence of Stock-outs at the University

Incidence of Stock-outs	Frequency	Percentage %	Valid Percentage %	Cumulative Percentage%
Every Day	7	9	9	9
Every Week	18	22	22	31
Once a Month	26	32	32	63
No Stock-out	24	30	30	93
Other	6	7	7	100

Source: Field Data (2016)

Table 4.8: Calculation of Reorder Points at the University

Calculation Method	Frequency	Percentage %	Valid Percentage %	Cumulative Percentage%
Computer Software	15	19	19	19
Human hand	57	70	70	89
MOE Allocations	6	7	7	96
Other	3	4	4	100

Source: Field Data (2016)

The data outlined above shows a disproportionate reliance on human intervention in the reordering of goods supplied to the University. This suggests that information may be distorted as it passes from one individual to the other. Researcher's such as (Rejman et al. 2012) inferred that modern business conditions are characterized by constant change. Their paper on management information systems in supply chain management shows the benefits in efficiency and cost savings can be achieved by such methods and the need to improve from systems based on human intervention.

Other MIS methodologies, such as Just –In-Time (JIT), Enterprise resource Planning (ERP), social media, internet and web services for communication between buyers and vendors should be integrated effectively to meet the needs of the firm. The adoption of MIS and e-procurement can have a high capital outlay, however cost benefit analysis show conclusively their worthiness in improving business performance.

4.4 Factors that Affect Average Procurement Lead Time

This section analysed the factors that affect average procurement lead time. Data was fed into SPSS statistical software and analysed using pseudo-R square parameters and membership information as a baseline to determine the significance of variables. As shown in Table 4.9, the five most important factors that affect average procurement lead time can be seen in the following order: Adequate knowledge of Ghana's Procurement framework (0.422 significance); the ability to design unambiguous procurement specifications (0.412 significance), Staff motivation and top management support (0.392 significance), Effective supplier selection (the reliability and capacity of suppliers) with 0.301 significance, Adequate and timely release of funds to the procurement unit (0.272 significance), Effective needs identification leading to prompt reordering of goods (0.108 significance).

Table 4.9: Ranking of Factors that Affect Procurement Lead Time

Factors	Significance.	Rank
Adequate knowledge of Ghana's Procurement framework	.442	1st
The ability to design unambiguous procurement specifications	.412	2nd
Staff motivation and top management support	.392	3rd
Effective supplier selection (the reliability and capacity of suppliers)	.301	4th
Adequate and timely release of funds to the procurement unit	.272	5th
Effective needs identification leading to prompt reordering of goods	.108	6th

Source: Field Survey (SPSS Analysis), 2016

4.4.1 Adequate knowledge of Ghana's Procurement Framework (legal factor)

As shown in Table 4.9 above that the most important factor in procurement lead time in the University is adequate knowledge of Ghana's procurement framework. This indicates the vital role of technical knowledge in procurement especially with Ghana's legal framework, plays in lead time of goods. It therefore stands to reason, that in order to ensure smooth flow of information up the supply chain and effective movement of goods down the chain, competent professionals must be at the helm of affairs. (Agbugbla, 2015) states in his research of a similar institution that procurement managers find their roles to be evolving into managing more complex procurement and supply chains that are defined by rapidly changing, continuously expanding and often uncertain business environments. Given the dynamism and uncertainty of the environment, procurement professionals take on responsibility for more complicated tasks and face increased challenges in supply chain decision making and that having the requisite knowledge is vital to the procurement success. The statement also holds true for procurement in the University of Health and Allied Sciences.

4.4.2 The Ability to Design Unambiguous Procurement Specifications

The study found that the second most significant factor is the ability to design unambiguous specifications. The ability to clearly state the specification of goods required cuts down time spent in finding the right product. It ensures that the procurement process is efficient and eliminates the need to return items supplied. The study indicates the importance to spend time developing the specification details to ensure consistency on product quality, pricing, functionality and products are fit for purpose in order to reduce the financial effects of the misleading specification. This is also a good process for suppliers to ensure they are quoting on a 'like-for-like' basis. In developing specifications it is crucial to differentiate between product requirements and product preferences and build in tolerances for suppliers to adhere to and not to restrict supply and build cost into a product. The process should involve a number of cross functional stakeholders such as finance units, end user departments, receiving officers and procurement staff.

4.4.3 Staff Motivation and Top Management Support

Top management was found to be significant in determining the procurement lead time in the University as indicated in table 4.4. This finding implies that motivating employees will promote their satisfaction and by so doing, enhance productivity and commitment. It is well known that the most important asset to any organization is the people. Without knowledgeable, dedicated, and motivated employees, a business cannot run properly or run efficiently to be as successful as it could be. There are many different factors to consider with the overall success of an organization, such as; operating costs, marketing, the economy, advertising, and most of all the employees. Although the costs of employees is part of the operating costs, it is one of the top

expenses that continues to rise, and there are many elements involved like; salaries, bonuses, training, pension, healthcare, retirement, and many other associated expenses. Organizations that hire the best employees can have problems if they are not properly motivated, happy, and taken care of. Employee motivation refers to the level of energy, commitment, and creativity that a company's workers apply to their jobs.

4.4.4 Effective supplier selection (the reliability and capacity of suppliers)

This finding shows that the ability to choose the right suppliers can reduce the average lead-time and that effective supplier selection process is very important to the success of any manufacturing organization. The objectives of supplier selection processes are to reduce purchase risk, maximize overall value to the purchaser, and develop closeness and long-term relationships between buyers and suppliers in today's competitive industrial scenario. The literature on supplier selection criteria and methods is full of various analytical approaches (Pal et al. 2013). The issues of supplier selection have attracted the interest of researchers since the 1960s, and research studies in this area have increased. Several authors have pointed out the importance of supplier selection by emphasizing the impact that decisions throughout the entire supply chain have, from procurement of raw materials to delivery of finished products to final customers (Pal et al. 2013).

4.4.5 Adequate and Timely Release of Funds to the Procurement Unit

Timely release of funds was identified as a factor in procurement lead time. Tendering and the procurement process requires funding in several instances to get going. Adequate and timely funding is required to ensure that procurement units are well resourced and better placed to conduct proper supplier selection and contract management to ensure timely delivery of goods.

4.4.6 Effective Needs Identification Leading To Prompt Reordering Of Goods

Finally, it was also found that effective needs identification was a significant factor in determining procurement lead time. The first step in the public procurement process is to identify requirements. All procurement requirements begin with the perception of a need. The role of procurement practitioners at this stage is primarily to estimate the procurement lead time given the most appropriate procurement method that would be suitable for such a requirement.

4.5 The Impact of Procurement Lead Time on Teaching and Learning

This section of the chapter presents the findings in relation to the third objective of the study which is analysing the impact of procurement lead time on teaching and learning within the University. Table 4.10 indicates the ranking of factors that affect goods availability in the University. Data was fed into SPSS statistical software and analysed using pseudo-R square parameters and membership information as a baseline to determine the significance of variables. Goods availability in the University are a direct measure of the effectiveness of teaching and learning within the context of this study.

Table 4.10: Ranking of Factors that Affect Product Availability in the University

Factors	Significance.	Rank
Procurement Lead time curbs the incidence of stock-outs in the University	.567	1st
On-time delivery/Due-Date performance of suppliers	.402	2nd
The availability of educational supplies and goods to the University	.333	3rd
Reduced inventory costs to the University	.128	4th
Performance improvement and better SCM in the University	.102	5th

Source: Field Survey (SPSS Analysis), 2016

The study shows that efficient procurement lead time curbs the incidence of stock outs in the University. It has the highest significance on members and their ability to teach or learn as the case may be. Stock outs are disruptive occurrences within the University. Learning is a continuous process that is negatively affected when interruptions occur. Stock outs frustrate staff, faculty and students and force them to take a number of corrective actions that are beyond the institution's control. Stock outs can cause financial losses, dissatisfy members, diminish loyalty, jeopardize strategic efforts, and obstruct proper planning.

Any attempts to reduce lead time and eliminate stock outs are therefore welcome in the Institution. Various methodologies and strategies are available to this end such as enterprise resource planning softwares to ensure effective reordering and better communication between stakeholders to enhance information flow.

On time delivery and due date performance of suppliers goes to the heart of lead time in the University. This represents an area that is not directly controlled by the University ad is only bound by contractual terms between suppliers and the institution. On time deliveries are therefore quintessential to adhering to procurement lead times. Proper procurement practices and effective supplier selection as well as good contract management practice are all cross-linkages that ensure that timelines are met.

The availability of educational supplies and goods to the University, Reduced inventory costs to the University, Performance improvement and better SCM in the University also play significant parts on product availability and by extension teaching and learning in the University. Supply chain systems typically do not exist in isolation. In effect factors and linkages exist in different processes and functional areas.

4.6 Strategies of Improving on Procurement Lead Time at the University of Health and Allied Sciences

This section presents the findings in relation to the fifth objective of the study which is analysed the strategies of improving on procurement lead time at the University. Data was inputted into SPSS software and anova tables generated to determine the significance various strategies based on membership responses. It was found that the most significant strategies were as follows: keeping to Ghana procurement regulations, outsourcing non-essential/non-core services, motivating staff and employees and training staff in the procurement and supply chain function. Table 4.11 shows the resulting significance when analysed with statistical software.

Table 4.11: Ranking of Strategies for Improving on Procurement Lead Time at the University

Strategies	Significance.	Rank
Keeping to Ghana Procurement regulations	1.000	1st
Outsourcing non-essential/Non-core services	.663	2nd
Motivating Staff and Employees	.493	3rd
Training Staff in the procurement and supply chain function	.130	4th
Passing strict rules and regulations to curb corruption	.123	5th
Developing good relationships with suppliers	.015	6th

Source: Field Survey (SPSS Analysis), 2016

Keeping to procurement regulations was identified as being cardinal to the improvement n lead time. Wilful disregard for laid down procedure has the tendency of creating a myriad of problems down the line. Attempts to circumvent procedure usually ends in complications which rather lengthen the time required to deliver items to the University.

Outsourcing non-core services as part of the procurement process can lead to significant improvement in the supply chain and subsequently lead time. Outsourcing of

specification requirements and inspections upon delivery can enhance the process and ensure that the right goods are delivered at the right time to the right people.

Motivating staff ad employees are a measure to which corruption is discouraged and a moral right to prosecute offenders founded. It is imperative to remove unnecessary temptations from staff by ensuring appropriate remuneration for their services. The fact the developing good relationship with suppliers the importance of supply chain collaboration in procurement management. This strategy is undermined by the adversarial nature of the nation's procurement framework. Efforts must be made in creating a collaborative environment with suppliers to promote effective communication.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSIONS

5.1 Introduction

This chapter concludes the thesis and is made the conclusions and recommendations of the study. It pieces together the work undertaken in achieving the aim and objectives set out in the first chapter. It shows among other things, various strategies and methods to improve procurement lead time in an educational institution and includes a paragraph on the need for further research in the area.

5.2 Summary of the Study

With regards to the first objective of the study, it was found that factors that affect procurement lead time in the university of health and allied sciences are; the Adequate knowledge of Ghana's Procurement framework, The ability to design unambiguous procurement specifications, Staff motivation and top management support, Effective supplier selection (the reliability and capacity of suppliers), Adequate and timely release of funds to the procurement unit. It was also found that major supplies to the university are from local and foreign manufacturing companies which indicate a relationship with the private sector. It was also found that the number of inventory turns per year at the university was less than 5 times and that the average procurement lead time is over a month. It was further found that stock out occurs once a month in the university.

For the third objective of the study, it was found that enhanced procurement lead time ensure goods availability and ensure on time delivery and better suppliers performance.

Enhanced procurement lead time reduces inventory costs and generally creates a better supply chain management system in the university.

Finally, for the fourth objective, Keeping to Ghana Procurement regulations, Outsourcing non-essential/Non-core services, Motivating Staff and Employees, Training Staff in the procurement and supply chain function, Passing strict rules and regulations to curb corruption, Developing good relationships with suppliers are valid strategies for improving procurement lead time in the university.

5.3 Conclusion of the Study

Procurement lead time has been identified as quintessential to effective teaching and learning at the university of health and allied sciences. In the intricate system that connects faculty and students, it s imperative to ensure that all necessary inputs are adequately provided and provided on time. Various stakeholders interact at several levels to make this possible. This case study concludes therefore that proper coordination between stakeholders is required to ensure effective supply chain systems.

The findings of the study also suggest that an over reliance on human intervention in procurement and supply chain activities is a major root cause of delays of inputs. It therefore stands to reason that e-procurement be introduced in the university. ERP systems such as SAP and others exist that can be used to improve the system. Proper MIS can also be deployed to assist in the management of information ad to ensure that is delivered promptly and to the right quarters.

Furthermore, actions and strategies that improve lead time such as motivating staff, further professional development, strict implementation of procurement rules and regulations must be promoted in the university.

It is worth noting that a case study approach was adopted to serve as a controlled environment to mirror similar occurrences in other public educational institutions. As such the finds of the study are applicable across the broad spectrum of educational institutions in the country at large. Strategies such as curbing corruption in the procurement process and better implementation of rules and regulations cannot be implemented outside of the national procurement framework. National interest must therefore shifted to obtain a further look at procure systems in the public sector or areas where public funding is applied.

5.4 Recommendations from the Study

Based on the findings of this study, the following recommendations are made:

5.4.1 The Use of Call-Off Contracts with Suppliers

It was found that stock outs are a monthly occurrence in the university. As an added measure against such incidences, call-off contracts should be used to ensure that there is always a contract in place to request urgently needed items. There is always the need to create an environment of certainty for faculty to ensure that critical research and teaching carries on. Categorization of inputs should therefore be done to determine such critical items and every effort made to ensure their availability.

5.4.2 The Use of E-Procurement and Electronic Reorder Systems

E-Government Procurement (eGP) also referred to as E-Procurement which is a comprehensive process in which governments use IT systems (including the Internet)to establish agreements for the acquisition of products or services (Bulletin, 2010). The Internet's rapid growth has driven many governments to add an electronic commerce component to their operations to gain competitive advantage (Bulletin 2010). Business-

to-business online procurement has recently emerged as one of the best methods of ensuring transparency in government procurement. . It is therefore imperative that e-Procurement is adopted ensure accountability, value for money and effective monitoring of the procurement process.

5.4.3 Training and Motivation of Procurement Staff

It is further recommended that the procurement employees of the university should on a regular basis undergo training as part of continuous professional development. This will enhance their execution of the procurement function and will also help in in increasing professionalism in the procurement process. It is also recommended that staff be well motivated in terms of remuneration in order to reduce the temptation involved with dealing with suppliers. Motivated staff are more likely to give off their best in the performance of their duties than less motivated staff who are far more likely to indulge in corrupt practices.

5.4 Development of Strong Supplier Relationships

The University's approach to suppliers needs to be part of the strategic plan since almost every company, whether product- or service-oriented and the institution is not exempt from this, is dependent on suppliers. Strong supplier relationships impact things such as Quality, Timeliness, Competitiveness, Innovation and total product cost. Strong supplier relationships ensure that the private sector is well prepared to respond to bids in a timely manner and supply the right product when required.

5.5 Reduction of Reliance on Central Government for Educational Inputs

It was found that a substantial part of goods supplied to the University was via the Ministry of Education and other such agencies. Due to the pressure on the central

government, fund allocation and release is irregular at best. It is therefore in the right direction for the University to rely on other avenues for inputs especially in terms of funding. Internally generated funds must be utilized effectively and a drive made towards a self-sustaining institution.

5.6 Need for Further Research

The success of the research and conclusions drawn, indicate that there is a need for further research in the area. Existing research puts the study of procurement and supply chain functions predominantly in the private sector. More work needs to be done to define the procurement and supply chain function in the public sector. Particular focus should be on determining if the underlying principles of supply chain and logistics function effectively in a public set-up and suggest ways to remove bottlenecks and improve efficiency.

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MASTERS OF SCIENCE IN PROCUREMENT MANAGEMENT

(KNUST)

APPENDIX 1: RESEARCH QUESTIONNAIRE

Dear Sir/Madam,

Synopsis

The purpose of this research is to assess the effect of procurement lead time on teaching and learning at the University of Health and Allied Sciences. The research is also to contribute to existing knowledge on Public Procurement and lead time in educational institutions. It is expected that the outcome of this research will provide feed-back to management of the University and aid in streamlining procurement processes more effectively. I would be very glad if you could spare a few minutes of your time to answer this questionnaire. I understand that all information provided will be used solely for the purpose of this research and treated strictly as confidential.

FREDERICK ADJEI SARPONG
MSc. Procurement Management Student
Mobile number- 0247000664

SECTION I (BACKGROUND OF RESPONDENTS)

Please tick where applicable in the box/space provided below:

1. University Membership Information

a. Student [ ] b. Teaching Staff [ ] c. Non-Teaching Staff [ ]

d. Other (Please specify): _____

2. Academic and professional qualifications

a. SSE and below [ ] b. B.Sc./HND holder [ ]

c. M.Sc./MBA or higher degree holder [ ]

d. Professional (Please specify): _____

3. What is your major role within this healthcare institution?

a. Director/ Chief Executive Officer [ ] b. Supply chain/ Procurement Manager [ ]

c. Lecturer [ ] d. Store Manager/Distribution [ ]

e.

Other……

……...

4. Working experience:

a. Less than 5 years [ ] b. 5 – 10 years [ ] c. above 10 years [ ]

SECTION II (THE AVERAGE PROCUREMENT LEAD TIME FOR GOODS SUPPLIED TO THE UNIVERSITY)

5. What are the sources of goods supplied to the University?

a. Local/foreign manufacturing companies [ ] b. Vendors [ ]

c. Manufacturer's representative [ ] d. Ministry of Education and other such agencies [ ]

6. Roughly how many inventory turns do you experience in a year (How many times do you order for the same item in a year?)

a. Less than 5 times in a year [ ] b. 5 - 10 inventory turns/year [ ]

c. More than 10 inventory turns/year [ ]

7. What is the average procurement lead time for goods supplied to the University (how long does it take for you to receive items you have requested for from the University)?

a. Less a week [ ] b. 1week to 4weeks [ ] c. Over a month [ ]

8. Are goods always delivered on time?

a. Always before time [ ] b. Always just on time [ ] c. Always delayed [ ]

d. Sometimes never supplied [ ]

9. How often does the University experience stock outs (How often are you informed goods you requested for are not available)?

a. Every day [ ] b. Every week [ ] c. Once a month [ ]

d. The University does not experience stock outs at all [ ]

10. How does the University calculate reorder point and the reorder quantity for its inventory?

a. Have a computer software application that calculates these quantities [ ]

b. It is done subjectively by an employee or at the request of students periodically or [ ]

c. Relies absolutely on the availability of goods from the Ministry of Education and other agencies [ ]

SECTION III (THE FACTORS THAT AFFECT AVERAGE PROCUREMENT LEAD TIME)

Please kindly answer the following: by ticking appropriate answers of your choice

11. The factors affecting average procurement lead time in the University are:

a. Effective need identification leading to prompt reordering of goods.

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

b. Adequate and timely release of funds to the procurement unit (Financial factor)

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

c. Adequate knowledge of Ghana's procurement act (Legal factor)

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

d. Motivating staff and seeking top management support (Management factor)

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

e. The ability to design unambiguous procurement specifications (Staff capacity)

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

h. Effective supplier selection (the reliability and capacity of suppliers)

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

SECTION IV (THE EFFECTS OF PROCUREMENT LEAD TIME ON PRODUCT AVAILABILITY IN THE UNIVERSITY AND SUBSEQUENT EFFECTS ON TEACHING AND LEARNING)

PLEASE INDICATE YOUR OPINION ON THE FOLLOWING FACTORS AND HOW THEY AFFECT TEACHING AND LEARNING IN THE UNIVERSITY

12. Availability of goods all year round promotes teaching and learning

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

13. On-time delivery/Due-date performance by suppliers promotes teaching and learning

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

14. Reduced inventory costs of the University promotes teaching and learning

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

15. Performance improvement and better supply chain management promotes teaching and learning.

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

16. Curbed the incidence of stock outs at the University promotes teaching and learning

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

SECTION V (STRATEGIES FOR IMPROVING ON PROCUREMENT LEAD TIME AT UHAS)

Please kindly answer the following: by ticking appropriate answers of your choice

17. Training employees in the procurement and supplies function

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

18. Passing strict rules to curb corruption

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

19. Motivating employees

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

20. Developing good relationship with suppliers

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

21. Outsourcing some services

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

22. Sticking to public procurement acts

□ Strongly Disagree □ Disagree □ Not sure □ Agree □ Strongly agree

THANK YOU FOR YOUR COOPERATION!!!!!!!!!!