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FOREWORD

I am pleased to put into the hands of readers Volume-6; Issue-7: Jul, 2020 of **"International Journal of Advanced Engineering, Management and Science (IJAEMS) (ISSN: 2354-1311)" ,** an international journal which publishes peer reviewed quality research papers on a wide variety of topics related to Science, Technology, Management and Humanities. Looking to the keen interest shown by the authors and readers, the editorial board has decided to release print issue also, but this decision the journal issue will be available in various library also in print and online version. This will motivate authors for quick publication of their research papers. Even with these changes our objective remains the same, that is, to encourage young researchers and academicians to think innovatively and share their research findings with others for the betterment of mankind. This journal has DOI (Digital Object Identifier) also, this will improve citation of research papers.

I thank all the authors of the research papers for contributing their scholarly articles. Despite many challenges, the entire editorial board has worked tirelessly and helped me to bring out this issue of the journal well in time. They all deserve my heartfelt thanks.

Finally, I hope the readers will make good use of this valuable research material and continue to contribute their research finding for publication in this journal. Constructive comments and suggestions from our readers are welcome for further improvement of the quality and usefulness of the journal.

With warm regards.

Dr. Dinh Tran Ngoc Huy
Editor-in-Chief
Date: Aug, 2020

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Utilization of Maintenance and other Operating Expenses (MOOE) of Non-Fiscally Autonomous Senior High Schools towards Achieving their Annual Improvement Plan (AIP)

Roselle J. Abellon, Genelyn R. Fariñas, Ana Beatriz D. Soriano, Thelma E. Rodriguez, Felipe E. Balaria

Abstract**—** *This study determined the utilization, budget allocation, and challenges encountered by the School Heads in the use of Maintenance and Other Operating Expenses (MOOE) funds in achieving the Annual Improvement Plan (AIP) in non-fiscally autonomous Senior High Schools the Division of Nueva Ecija. The 20 school heads were purposively selected as respondents of the study. The results revealed that the majority of non-fiscally autonomous senior high schools have MOOE ranges from Php250,000-Php 900,000 ($5,000 - $18,000) and with a population of 130 to 750 students. The MOOE budget for every year depends upon the number of enrollees. School heads have utilized 51% to 75% of MOOE funds for each activity/program indicated in AIP. The majority of them were given priority on security and utility services and challenged on the complaints and misconceptions about spending and allocating of MOOE expenses. Transparency, accountability, and maintaining harmonious relationships are the keys to ensure collaboration and teamwork for the betterment of school and learners as well.*

Keywords**— Annual Improvement Plan, non-fiscally autonomous schools, Utilization of MOOE.**

I. INTRODUCTION

To promote and strengthen school-based management and accountability the school budget/fund is one of the most powerful tools[1]. School heads and budget officers are working as a team to properly plan and implement the use of budgets based on the Annual Improvement Plan (AIP). In the same manner, different aspects of prioritization should be considered such as utility, training, securities, travel expenses and communication, repair and maintenance, and other expenses [2].

The order is strongly committed to support the schools, teachers, and students by increasing the number of resources that are available for them and enhancing the standards on teaching and services [3]. They amend financial management reforms on transferring the responsibility and accountability to School Head and Administrative Staff of schools on managing school finances and operations and developing the school facilities and other necessities that support learning courses and provide a safe, healthy and conducive environment for students and teachers [4], [5].

Analyzing the aforementioned statement, the main goal of giving MOOE funds is to achieve programs and projects in the AIP to meet the expenses of the school in terms of utility, security, training of teachers, travel expenditures, supplies, repair, and maintenance, etc. That procedure is intentionally done to boost students' performance andassist them in their academic endeavors [6].

Schools Division Offices (SDO) may transfer MOOE funds in advance to the respective school especially to the non-fiscally autonomous schools in order to be utilized for their funding plans that are subjected to government accounting and auditing rules. In this regard, school heads have to maintain current bank accounts under the name of his or her designated school. Moreover, he or she should also provide monthly liquidation report to be submitted to the SDO for monitoring purposes that are also subjected to

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accounting and auditing rules of the government as what has been mentioned above [6].

The Department of Education (Dep. Ed.) top management employees like school heads or principals should secure or allot the budget to conduct enhancement training from MOOE. The implementation of that can help teachers in addressing their challenges and be kept upbeat for continuous professional development [7], [8], [9].

It is the job of the principal to be effective, to ensure that all plans and programs in AIP are attainable and included in the MOOE budget [10]. In this respect, the ability of the school head to manage the school finances is vital in achieving educational goals and objectives [11]. In addition, planning and utilizing the MOOE budget should involve all stakeholders to create a beneficial impact on transparency and establish an opportunity for ethical practices [12].

In the Department of Education, it is a fervent dream that every school financial manager must strengthen transparency and accountability throughout the department. They must ensure effective planning of activities, ideal budget preparation, and smart execution of programs and projects. They should also implement consistent monitoring processes by providing one single reference governing their regular duties and responsibilities to attain better quality and timeliness of statutory and ad hoc financial reporting [12].

Primarily, this study aimed to determine the budget allocation and challenges encountered by the School Heads in the utilization of Maintenance and Other Operating Expenses (MOOE) funding in achieving the Annual Improvement Plan (AIP) in non-fiscally autonomous Senior High Schools in the Division of Nueva Ecija.

II. METHODOLOGY

This study utilized mixed- methods research design, quantitative and qualitative design in order to describe the mode of utilization, budget allocation, as well as the challenges in theutilization of MOOE of non-fiscally autonomous secondary schools based on AIP in the Division of Nueva Ecija. The 20 respondents were purposively chosen [13] as cited in [14]in non-fiscally autonomous schools to serve as samples. The survey questionnaire and interview guide questions were served as the instrument used to contribute to the required data. The survey questionnaire and interview guide were personally developed by the researchers and subjected to reliability and validity using Cronbach's Alpha. A value of 0.912 was obtained which signified that the questionnaire is 91.2% reliable.

In the treatment and interpretation of data, the researchers used the logical matrix and comparative analysis for the qualitative research design. On the other hand, frequency count, percentage, and weighted mean were used for quantitative research design.

III. RESULTS AND DISCUSSION

Profile of the Schools

The result of the study shows that majority of the MOOE of non-fiscally autonomous schoolshave a budget that ranges from Php 250,000 to Php 900,000 ($5,000 - $18,000). They have a population of 130 to 750 students. They have also 8 to 15 teachers. Their schools consist of 1 to 2 school heads. They have also 1 to 2 security guards and utilities. Those schools are comprised of 10 to 20 classrooms. Moreover, they have 2 laboratories, and they usually have 2 to 4 administrative staff. Based on the interview conducted, the MOOE fund depends on the number of enrollees of each school for every school year.

Utilization of MOOE Based On AIP

In terms of the utilization of MOOE based on AIP for S.Y. 2019-2020. It is shown in Table 1 that the overall weighted mean got 4.01 and interpreted as "Often Implemented" which means 51% to 75% of the activities that are stipulated in the AIP are implemented. On the other hand, the parameter "Pay for wages of full-time janitor, transportation/mobility and security services" got the highest weighted mean of 4.55 which means "Always Implemented". On the other hand, the idea "Fund for minor repairs of facilities, building and ground maintenance and upkeep of school" got the lowest weighted mean of 3.55 interpreted as "Often Implemented". The results signify that the school heads often implemented plans and activities in AIP. However, they particularly give priority in paying the wages of the janitors or utilities, security guards and also provide their transportation and security services. Furthermore, they support the school-based training and activities for the common and benefit of the majority.

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Table 1

Weighted Mean and Verbal Inrepretation of Utilization of MOOE Based on Annual Improvement Plan

Utilization of MOOE -Annual Improvement Plan	WM	Verbal Interpretation
1.Procure school supplies and other consumables for teachers and students deemed necessary in the conduct of classes	3.70	Often Implemented
2.Pay for reproduction of teacher-made activity sheets or exercises downloaded from the Learning Resource Management and Development System (LDRMS)	3.60	Often Implemented
3.Fund minor repairs of facilities, building and grounds maintenance, and upkeep of school	3.55	Often Implemented
4.Fund rental and minor repairs of tools and equipment deemed necessary for the conduct of teaching and learning activities	3.75	Often Implemented
5.Pay for wages of full-time janitorial, transportation/mobility and security services;	4.55	Always Implemented
6.Pay for school utilities (electricity and water) and communication (telephone and Internet connectivity) expenses	4.45	Always Implemented
7.Support expenses for school-based training and activities selected or designed to improve learning outcomes, such as but not limited to, Learning Action Cells (LAC) and Continuous Improvement (CI) sessions	4.40	Always Implemented
8.Support special curricular programs (e.g. advocacy, assessment, capacity building, learning environment, learners' development, and research)	4.20	Always Implemented
9.Fund activities as identified in the approved School Improvement Plan (SIP) for implementation in the current year and as specifically determined in the Annual Implementation Plan (AIP) of the school	3.90	Often Implemented
10.Finance expenses pertaining to graduation rites, moving up or closing ceremonies and recognition activities	4.00	Often Implemented
Total Weighted Mean	**4.01**	**Often Implemented**

Legend: 1.00-1.79 – Never Implemented; 1.80-2.59 – Rarely Implemented; 2.60-3.39 – Sometimes Implemented; 3.40-4.19- Often Implemented; 4.20-5.00 – Always Implemented

Budget Allocation of MOOE Pertaining to the Expenses of the Schools

Table 2 shows the budget allocation of MOOE. As shown, the majority of the school heads give priority on "security and maintenance service expenses" and "training expenses (teachers and administrators) with a weighted mean of 4.40 and 4.35 respectively. Both of them are interpreted as "Extremely Allocated/prioritized". While the parameter that receives the least budget is the utility expenses having the weighted mean of only 3.00 and with verbal interpretation "Moderately allocated/Prioritized". The results depict that the school heads have always prioritized and allocated budget for security services and training of teachers and administrators. The prioritization is just prim and proper because it calls for everyone's welfare. That solid decision creates a safe school that is conducive to the learning environment for the learners. On the other hand, training will enhance the quality of teachers and administrators who will eventually transcend quality education to the students. In the light of the idea of utility expenses that receive lesser in importance can be justified that the school heads can look for some stakeholders who can provide cleaning materials and other utilityservices for the schools.

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Table 2

Weighted Mean and Verbal Interpretation of Budget Allocation of MOOE

BUDGET ALLOCATION OF MOOE	WM	Verbal Interpretation
Utility Expenses	3.00	Moderately Allocated/Prioritized
Security and maintenance services expenses	4.40	Extremely Allocated/Prioritized
Training Expenses (Teachers and Administrative)	4.35	Extremely Allocated/Prioritized
Travel Expenses	3.90	Highly Allocated/Prioritized
Supply Expenses	3.80	Highly Allocated/Prioritized
Repairs and Maintenance	3.90	Highly Allocated/Prioritized
Other Expenses	3.45	Highly Allocated/Prioritized

Legend: 1.00-1.79 – Not Allocated/Prioritized; 1.80-2.59 – Slightly Allocated/Prioritized; 2.60-3.39 – Moderately Allocated/Prioritized; 3.40-4.19- Highly Allocated/Prioritized; 4.20-5.00 – Extremely Allocated/Prioritized

Challenges or Problems Encountered in the Utilization of MOOE Based on AIP

Based on the interview made by the researchers, the majority of the respondents were challenged on the complaints and misconceptions about spending and allocating the MOOE expenses because teachers are lack involvement and awareness in decision making in AIP. Aside from that, the insufficient budget together with the delay of releasing of checks affects the procurement of needed materials and payment of services.

Another circumstance that calls for head teachers flexibility in the financial aspect is gleaned in the question "What is the common, but difficult instances that you encounter in giving remedies through MOOE allocation?" This question draws the response that the insufficiency of MOOE funds for repairs and other necessary improvements of the schools leads to the majority of them in looking for another source of funds to fully implement the AIP. And sometimes, they ask assistance from supportive stakeholders and school partners.

Even in the events that gear to academic excellence, their moral fortitude is tested and seen in the question "Up to what extent does MOOE funds should assist teachers' and learners' need to elicit excellent process of education?" The majority of the head teachers relayed they're being supportive whenever the students compete whether be it in the district, division, regional, national, or even international level. They definitely allot a certain budget for the competitions.

Despite these drawbacks, the school heads are remained optimistic, flexible, and tried their best to achieve at least 75% of AIP plans.

IV. CONCLUSIONS AND RECOMMENDATIONS

The majority of the principals or school heads set "fund for minor repairs of facilities, building and grounds maintenance and upkeep of school" was their least priority. Pertaining to budget allocation,utility expenses are moderately given priority. Despite some drawbacks regarding MOOE, still, the majority of the principals are flexible in handling it since they look for some generous stakeholders. They are also smart in allocating their budget to be stipulated in their AIP because they prioritize academic excellence like allocating budget for the contests of the teachers and students.

Based on the findings of the study and conclusions drawn, the following recommendations are offered:The School Heads should plan programs and activities that are achievable and fundable for every annual MOOE budget. They must set standards and priorities in planning AIP and have plan B to attain the year-round objectives and ensure priorities and values, likewise; school heads must ensure that the drafted AIP is based on MOOE to make the programs and project be attainable and applicable to the school to avoid negative feedbacks and doubts from their subordinates.Teachers and other members of the community must be involved in the planning and organizing of activities included in the AIP. Head teachers should set a division of labor among themselves so that they can feel their involvement as the school progress. Lastly, the Department

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of Education personnel should always ensure transparency which is necessary to strengthen the culture of accountability and trust among community members, teachers, and school heads. As a team, all members of the school community should maintain harmonious relationships and know collaboration to establish effective and efficient [15] means of conveying information. They should also be kept motivated for the benefit of the school and learners as well.

V. ACKNOWLEDGMENT

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Managing the Pharmaceutical Supply Chain: 'By Wire' "The next big thing"

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Abstract**—** *The emergence of computers in the 20th century has enabled the evolution of new age technology. Today, advances in information technology, the globalization of markets, and the push toward efficiency and sustainability continue to create challenges and opportunities that did not exist few years ago. In recent years, the ever-increasing technical complexity of standard consumer goods, combined with the ever-increasing size and depth of the global market, indicate that the connection between vendors and consumers is usually the link in the supply chain. The stampede to acquire new technologies, scientific innovations and managing technology are an imperative in every sectorfor which the health care industry is not an exception. In the healthcare industry, there could be added risk and complexity in the supply chain that can have adverse effect on patient safety and health outcomes. Hospitals and health systems are beginning to tap into the ignored opportunity: "pharmaceutical supply chain optimization". Businesses such as healthcare will have to reorganize and continue to modify their business-model to capture potential benefits on emerging technological innovation that can positively affect patient care and costs.*

Keywords**— Information Technology, Radio Frequency Identification (RFID), Electronic Product Code (EPC), Sense-and-Response, Pharmaceutical supply/Value Chain,Drug Supply Chain Security Act. (DSCSA) Blockchain, and Cloud Based software solution.**

I. INTRODUCTION

Technology represents new ways of doing things, and, once mastered, creates lasting change, which businesses and cultures do not "unlearn." Adopted technology becomes embodied in capital, whether physical or human, and it allows economies to create more value with less input. At the same time, technology often disrupts, supplanting older ways of doing things and rendering old skills and organizational approaches irrelevant. When IT is adopted or implemented correctly, in supporting the supply chain processes, it provides some potential benefit. Firms and or organizations that integrated some IT enablers have enjoyed the benefits of the integration with other supply chain partners, therefore gaining competitive advantages over those who have not incorporated such integration. For the globally connected and competitive market, such as healthcare, the use of information technology (IT) is becoming an effective paradigm. Therefore, to coordinate and synchronize supply chain, firms need information and communication technology as an enabler to achieve a higher level of supply chain efficiency. Briggs, C.A, (2015). In today's globally connected and dynamic markets, companies are making every effort to improve their organizational competitiveness to achieve a sustainable competitive advantage while meeting the changing global market requirement. Improvements in information technology have continuously facilitated business processes by enabling physical, information, and monetary (financial) flows across business organizations and with business partners. Bozarth& Handfield, (2008).

Digital transformation is no longer an option – it is an imperative. Billions of people are using social and digital communities to provide services, share insights, and engage in commerce. All the while, new channels for engaging with customers are created, and new ways for making better use of resources are emerging. These communities allow companies not only give customers what they want, but also align efforts across the business network to maximize value potential. To seize the opportunities ahead, businesses must go beyond sensors, Big Data analytics, and social media. More importantly, they need to reinvent themselves in a

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manner that is compatible with an increasingly digital world and its inhabitants (a.k.a. your consumers). For example, the American Society of Clinical Oncologists (ASCO): Nonprofit organizations is transforming cancer patients care digitally worldwide, by consolidating patient information with its Cancer LIN. By unlocking knowledge and value from the 97% of cancer patients who are not involved in clinical trials, healthcare providers can drive better, more data-driven decision making and outcomes. Feldman and Suppal (2015).

Indeed, implementing new technology requires strong structure, retraining and attention to details such as installing and accommodating of the physical components as well as integrating any associated software applications with existing systems. However, integrating all these areas in the IT implementation will minimize user anxiety, make the process easier to manage and enable the organization to achieve its desired goals. Several technological innovations are pushing the healthcare and pharmaceutical industries into new realm that dictates the need for different healthcare supply chain model. Companies today, consider information technology (IT) as an effective tool to control and manage the complex supply chains as well as improving efficiency and logistic operations, while remaining responsive to changing customer demands and market situations, for which the health care industry is not an exception. In today's Information Age, more and more knowledge, and more and more ways of creating economic value are being abstracted into symbols that can be combined, transformed, and sent around the world at an electronic speed. The ability to manipulate this dematerialized reality drives both wealth creation and the discontinuous change that makes sense-and -response organizations necessary. Haeckel S. (1999).These emerging technologies are enabling greater efficiency to manufacture and distribution operations while speeding up the interface to the patient. Today, there is more focus on patient outcomes and access to information on patients is becoming as critical as the drug products. As the United States adds more stringent regulations and environmental controls, pharmaceutical and healthcare industry are struggling to comply. While these factors affect different aspects of the pharmaceutical and healthcare realms, companies are evaluating their options and taking a strategic look at their current supply chain approach.Datexcorp.com (nd).

Despite the widely accepted use and acknowledgement of the importance of IT for efficient supply chain management (SCM), the actual benefits and nature of IT in specific functions in the pharmaceutical industry supply chain is still not fully explored. Most of this study is confined to published reviews of relevant literature on information technology and operations of the pharmaceutical industry across the globe. Indeed, the concepts of information technology in supply chain keep changing due to advances/innovations in technology. The advent and acceptance of costlier, more condition-sensitive medications and drug therapies, the growing, disparate range of product types and therapies which have shorter product lifecycles and other factors, has produced new complexities for the pharmaceutical supply chain that is in the process of shifting from the established version to a digital supply chain.Datexcorp.com (nd). Changes in technology will continue to update business models that will lead to truly ***"THE NEXT BIG THING"*** with a new mantra ***"ADAPT OR PERISH."*** Briggs, C. A (2017).

II. COMPOSITION OF THE PHARMACUTICAL INDUSTRY

The pharmaceutical industry consists of drug manufacturers, biotechnology companies, distribution, and wholesale companies. The primary focused of the industry is on medicinal and veterinary chemical and biological compounds. Global Edge (2019). The pharmaceutical industry is defined as the discovery, development, and manufacture of drugs and medications. It is widespread, including research, chemicals, and the regulation and involvement of government agencies. However, the characteristics of the pharmaceutical industry differ by region.

The European pharmaceuticals industry: Is regulated by the European Medicines Agency and European Union-wide legislation, which target packaging, safety, transparency, and authorization procedures. The biggest pharmaceutical company in Europe is Bayer.

The pharmaceuticals in Africa. African pharmaceuticals are growing and expected to be worth $40 billion to $65 billion by 2020. This growth is caused by urbanization, healthcare capacity, and better business environment. Urban households can adopt modern medicines. Indeed, healthcare is becoming more efficient, which lead to the introduction of price controls and import restrictions by governments throughout the continent. Furthermore, some governments

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are considering promoting more local production of drugs to reduce the need for imports.

The Latin America Pharmaceuticals: There is expected growth in this pharmaceutical industry, but the market is difficult to predict, due to weaker data points available than some other regions. The growth is most likely in Brazil, Argentina, Mexico, and Colombia. Brazil and Mexico are key countries in pharmaceuticals around the world. With a recovering economy, Argentina's pharmaceutical industry tend to be growing, while Colombia has the potential to be at the top of the pharmaceutical industry in Latin America.

The United States Pharmaceuticals. A large segment of the United States population uses prescription drugs. The pharmaceutical industry holds 45% of the pharmaceutical market. The top pharmaceutical company in the United States is Pfizer, with total revenues of 53.6 billion dollars. In terms of government regulation, the United States Food and Drug Administration is responsible for regulating drugs before sale to citizens. Pharmaceuticals are a major industry, and, clearly, one that has immense potential, and an expected worth of $1,170.00 billion in 2021. VanDyke E. (2019).

To sustain growth the pharmaceuticals industry requires large capital investment and therefore, spends relatively high percentage of its funds on extensive Research & Development (R&D).The pharmaceutical industry is one of the most heavily regulated sectors in the world. Drugs are evaluated for safety, efficacy, manufacturing quality, misleading product claims and illicit inducements to choose a particular drug although prices are regulated in many countries through their respective healthcare and insurance systems. Evidently, the increase cost of R&D in pharmaceuticals and biotechnology further increase the prices of medicines. The rapid increase in price in the United States, lead to some speculation that, unless there is regulation at some point, only the wealthy will be able to afford medicine. While product success in the U.S. market is largely determined by open competition based on quality, safety, and price, internationally, companies face a patchwork of uneven regulations, protectionist policies and price controls. These obstacles are increasingly being instituted in both developing and developed countries.

Regulatory complexity and efforts to contain accelerating health costs are key challenges the U.S. industry needs to overcome. According to the Census Bureau the pharmaceutical industry is comprised of companies engaged in researching, developing, manufacturing, and distributing drugs for human or veterinary use. New drugs have an enormous positive influence on global health, prosperity, and economic productivity by saving lives, increasing life spans, reducing suffering, preventing surgeries and shortening hospital stays. Advances in medicine have eliminated deadly diseases and have brought other life-threatening conditions under control. ITA Pharmaceuticals Top Markets Report (2016). The leading companies in the pharmaceutical industry are characterized as "Big Pharma" and they generate more than fifty percent of the industry's sales with headquarters located in the United States, United Kingdom, Switzerland, Germany, and France. Pharmaceutical leaders include diversified companies such as Johnson & Johnson and Abbott Laboratories in the United States; Bayer in Germany; GlaxoSmithKline in the United Kingdom; and non-diversified companies such as Pfizer and Merck in the United States; Novartis in Switzerland; and Sanofi in France. Amgen and Genentech are the biggest sellers among biotech companies. The remainder of the industry is very fragmented, with many specialty companies such as small biotech companies that are often bought up by the "Big Pharma" before they can become a threat. The Pharmaceutical industry is Highly Concentrated, and production is dominated by a small number of large firms that are able to shape the industry's direction and price levels. European countries, and other countries with existing pharmaceutical industries, have governmental regulations in place, although, it is still a challenge. Global EDGE (2019).

A company's value chain sits behind its web page. Indeed, what is common among the industries is the power of the web-based technologies that significantly change the status quo by providing a mechanism that further integrates the value chainby delivering products and services more efficiently and effectively to the end users. Norris, G. et.al (2000).Innovations in information technology are radically changing the way people around the globe live, communicate and work.The effective use of Information Technology in the supply chain is its ability to share information within the supply chain partners. Briggs, C.A.(2015).The economic, social, and political benefits of new wireless information and telecommunications are changing the relative competitiveness of nations as access to those technologies' spreads rapidly around the globe. Gaspar et.al (2017). The emergence of information and communication technology (ICT), such as Electronic Data Interchange (EDI), Radio Frequency Identification (RFID), the Internet, World Wide Web (WWW) and other range of related e-business

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technologies, has created new opportunities and threats to logistics and supply chain performance. Briggs, C.A.(2015).

III. TOPOLOGY OF THE PHARMACEUTICAL SUPPLY CHAIN

The emergence of the global corporation and the global supply chain has brought about parallel changes in today's global economy; however, supply chain management has become ever more complex. Peter Trkman et al (2005). The phrase "supply chain" is always used to describe the logistics activities. In an individual firm's manufacturing, transportation, distribution, or retail network, it represents an integrated view across process. It is a critical concept to drive coherent strategies and to manage an organization around common (end-to-end) performance objectives (Lasschuit & Thijssen, 2004). Modern supply chain networks are not simple linear chains or processes; they are a set of complex networks of products and information flows that travel between the nodes of different networks. Indeed, supply chains are extremely complex, and every industry's chain has its own different quirks and characteristics. Supply chain is a link of resourcesand processes that begins with the sourcing of raw materials and extends through the delivery of the end products to the final consumer. This explains the concept that, a company's supply chain links its upstream suppliers and downstream distributors. For example, Walmart is part of the supply chain for hardware, clothing, electronics, and various other products. Mentzer T. et al. (2001). Christopher M. (1992), assert that, supply chain is a network of organizations that links the upstream and downstream processes and activities that creates value in the form of goods and services in the hands of the final consumers. As shown,in Figure. 1, aTraditional supply chain is viewed as an integrated process where the flow of finance and information is a two directional process while the flow of goods and services is one directional.Coyle et.al (2009), assert that, supply Chain management can be viewed as a pipeline or conduit for the efficient and effective flowof products/materials, services, information, and financials from the suppliers through the various intermediate organizations/companies out to retailers or consumers or the system of connected networks between the original vendors and the ultimate final consumers.

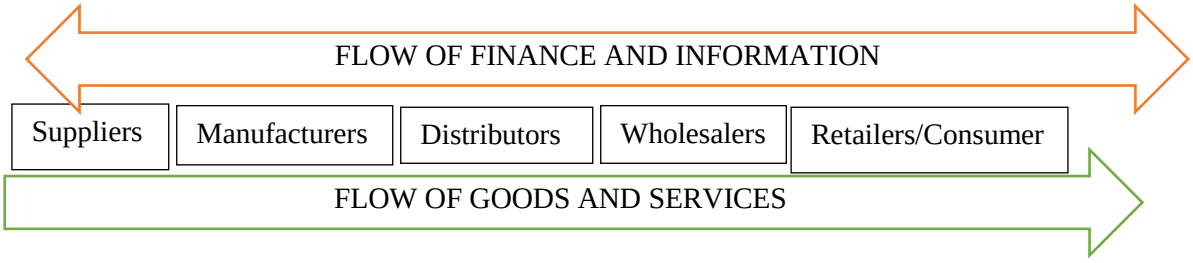

Fig. 1: Integrated Supply Chain

'Pharmaceuticals' (or 'drugs', 'medicines') in this study refers to innovative and generic products, chemically, and biologically-derived products, and prescription-based and over-the-counter products. Pharmaceuticals originate from the manufacturing sites and are transferred to wholesale distributors who distributes it to the retail outlets and mail order, pharmacies; healthcare facilities, hospitals, nursing homes and other healthcare providers and finally dispensed by pharmacies; and ultimately delivered to patients or consumers. The pharmacy supply chain is the means through which prescription medicines are delivered to patients. The Kaiser Family Foundation (2005).Supply chain integrations are usually complex regardless of the industry; however, the pharmaceutical supply chain integration is more challenging and difficult. The pharmaceutical supply chain seems to appear or look simply, but with closer look reveals other supply chain members who have significant influence over the ultimate distribution of pharmaceuticals to healthcare consumer. Example of such supply chain members are health insurance payers, pharmacy benefit managers (PBMs), group-purchasing organization (GPOs), and pharmacy services administrative organizations (PSAOs). Manufacturers of prescription drugs, both brand and generic, ship their products to primary distributors (e.g. traditional wholesalers), for distribution to pharmacies and other healthcare providers.

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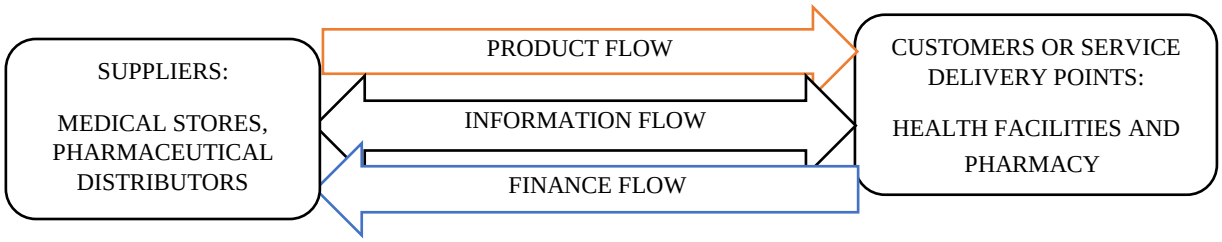

Fig.2: Three Basic Elements of the Pharmaceutical Supply Chain

The role of supply chain management is to manage and optimize these three flows.

The Three Basic Elements of the Pharmaceutical Supply Chain Management (Shown in Fig. 2: There are three basic element of supply chain management: the product flow, the information flow, and the finances flow.

- **The Product Flow** – The product flow involves the movement of pharmaceuticals from a supplier to a customer or service delivery points,in this case, the health facilities and pharmacy. This flow also concerns customer returns and service needs.
- **The Information Flow** – The information flow centers on transmitting orders and updating the status of delivery.
- **The Financial Flow** – The financial flow involves credit terms, payment schedules, and consignment and title ownership arrangements. Camcode (2020).

The United States Department of Commerce (2016) distinguished the segment of pharmaceuticals as follows:

Generic Pharmaceuticals: Produces copies of innovative pharmaceuticals with the same active ingredient, strength, dosage form, and route of administration. In the United States for example, upon either patent expiration or a successful challenge of relevant patents, a manufacturer can produce a generic drug if it meets FDA approval and bio-equivalence standards. Generic companies typically focus on high volumes to earn profits, requiring efficient production methods and distribution chains.

Biopharmaceuticals: Arebiological or cell-based drugs. Pharmaceuticals (biopharmaceuticals, drugs, medicines) are defined as any substance intended for use in the diagnosis, cure, mitigation, treatment or prevention of disease or any substance (other than food) intended to affect the structure or function of the body.

Innovative Pharmaceuticals: Are chemically derived drugs developed by an innovator (originator), following extensive R&D efforts in clinical trials in both humans and animals. The innovator relies on patents, regulatory data protection and other forms of intellectual property rights (IPR) to justify the investment required to bring a product to market. The pharmaceutical industry is heavily dependent on the development of new molecules to replace the revenue stream of older drugs that are approaching the expiration of their patent terms. (U.S. Department of Commerce 2016).Enyinda C. and Briggs C. (2009) identified two sources of supply chain risk drivers as: internal and external. They described the internal risk as the risk under the direct control of the organization and while the external risks are risks beyond a firm's control, including demand and supply risk, counterfeits, regulation and legislation, third-party relationship. These external risks can disrupt the reliability and continuity of the smooth flow of pharmaceuticals and/or active pharmaceutical ingredients. A breach at any point in this continuum could lead to dangerous and even deadly outcomes for patients.

Participants in the Pharmaceutical Supply Chain

A manufacturer produces the drug product and is usually the entity that submits the application to FDA for approval to market the product or that holds the approval.

A wholesale distributor sells the drug to "persons other than a consumer or patient".(21 CFR 203.3)(2011).The pharmacy supply chain shows the steps a finished drug product may take on its way from the manufacturer to the dispenser who will give the drug to the individual patient. This segment of the supply path is called downstream. The upstream segment ends with the manufacturer and involves the sources of materials that the manufacturer uses to produce the finished drug product, such as active pharmaceutical ingredients and inactive ingredients (e.g.,

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fillers, binders, and colors). The increasingly complex drug supply chain, from raw source materials to finished products for consumers, presents multiple opportunities for the product to be contaminated, diverted, or otherwise adulterated. Therefore, securing the supply chain will require minimizing risks that will arise anywhere along the supply chain: from sourcing a product's ingredients through the overseeing of a product's manufacture, storage, transit, sale, and distribution.

A primary wholesale distributor gets the drug products directly from the manufacturer and sells them to other wholesalers or dispensers. Three large primary wholesale distributors accounted for 85% of U.S. pharmaceutical wholesaling revenue; these are McKesson Corp., Cardinal Health Inc., and AmerisourceBergen Corp. Pew Health Group (2011) and Adam Fein, (2012).

An authorized distributor of record (ADR) is a wholesale distributor that has a relationship with a manufacturer that is ongoing, defined in regulations as including a written agreement specifying which products it will distribute and for which period. Not all primary wholesalers are ADRs. Pew Health Group (2011)

The term secondary wholesale distributor generally applies to wholesale distributors that acquire drug products from a wholesale distributor, not directly from the manufacturer. Some wholesale distributors focus on a region of the United States; others focus on a specialty market, such as cancer drugs, or on the discounted drug market. FDA (2001).

A re-packager removes a drug from its container and places it in another, usually smaller container for sale to a distributor or dispenser.

A third-party logistics provider may take temporary physical possession of the drug, such as during transport or warehousing, under contract with a manufacturer, distributor, or dispenser, but does not assume ownership of the drug.

A dispenser provides the drug to the consumer/patient. A dispenser may be an independent, community pharmacy; a retail chain pharmacy; a hospital or health care facility; a doctor's office; etc. as depicted in figure 3. Indeed, the generic pharmaceutical supply chain, surmise that, the pharmaceutical manufacturers manage the distribution of drug products from the point of production to the drug wholesalers and in some instances, directly to retain pharmacy chains, specialty pharmacies, hospital chains as well as to some health plans. While wholesale distributors are the manufacturers' largest purchasers, in some cases, drug manufacturers also distribute products directly to government purchasers including the AIDS Drug Assistance Program (ADaPs), Veterans Administration and Vaccines for Children (VFC) program. Datexcorp.com(nd)

In addition to the members of the supply chain, other entities also have interest in its functioning. The primary federal regulator of drug safety, and drug supply chain, is the Food and Drug Administration (FDA), joined by others, such as the Centers for Disease Control and Prevention (CDC) and the Federal Trade Commission (FTC), as warranted. A state regulator can be a board of pharmacy, often placed within a state department of health. Professional and industry organizations with interest in pharmaceutical supply chain security include those representing pharmacists, pharmacies, health care institutions, manufacturers, distributors and wholesalers and data-andcode-basedtechnology (hardware and software) developers and maintainers. Congressional Research Service (2013).

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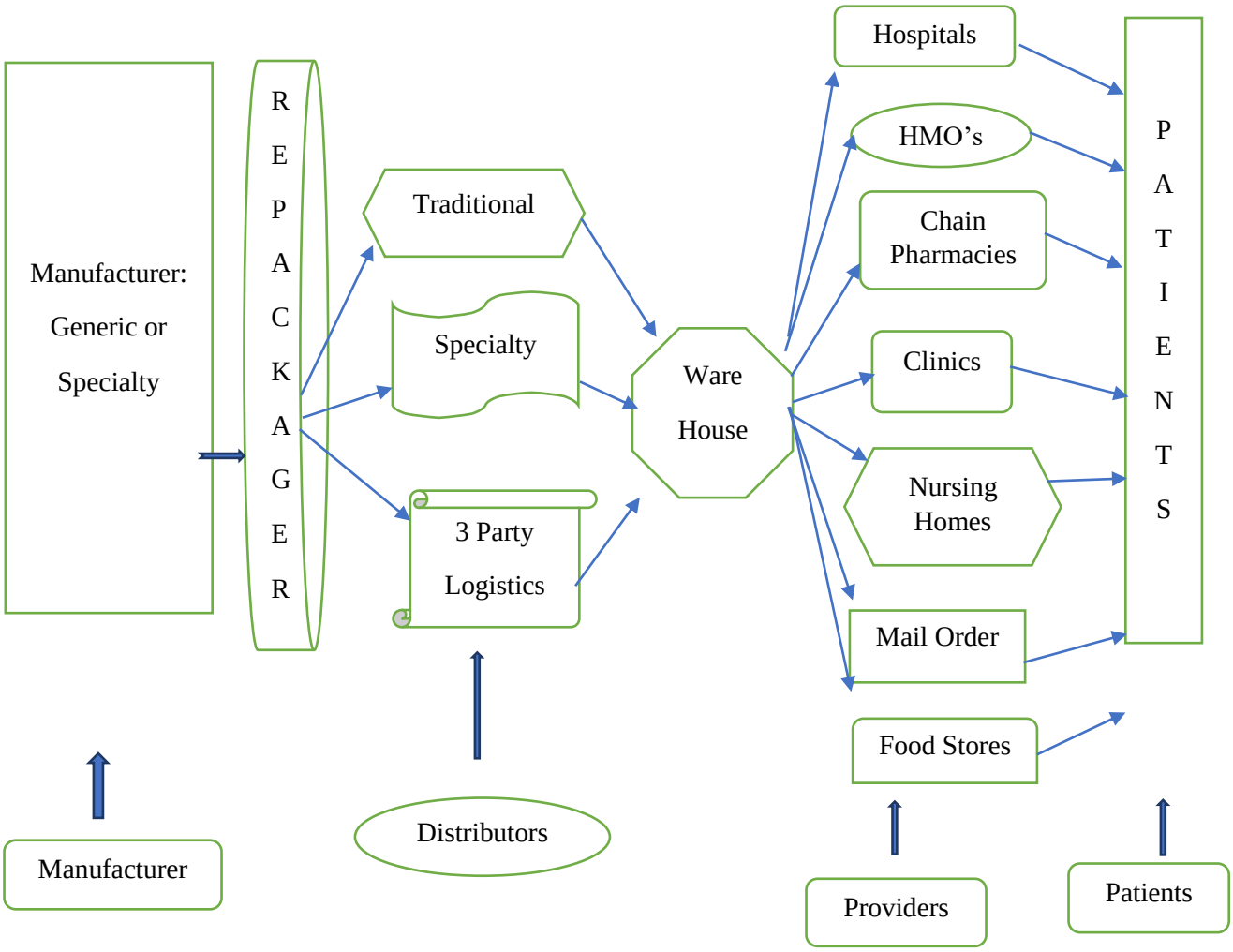

Fig.3: A Generic Pharmaceutical Industry Supply Chain

This flow ensure that drugs are readily available from the manufacturers and distributed through the providers to the patients.

The production planning and inventory control process is comprised of the manufacturing and storage processes which includes the design and management of the entire manufacturing process. The distribution and logistics process determine how products are retrieved and transported from the warehouse or storage facility to the retailer. These processes interact with each other to form an integrated supply chain. (Benita M. B,(1998).

Three major components of the pharmaceutical value chain according to Murray Aitken, (2016) includes:

1. Manufacturing of the medicine: Starts the initial research and development phase, to getting regulatory approval that allows the medicine to be available for sale in a market, to the final phase of commercialization. The process and requirements may differ based on the specific medicine, manufacturers, and the country of manufacture.

2. Distribution to the dispensing point: This includes the transportation and handling of the medicine from the manufacturer to the end user. (e.g. retail pharmacy (retailer), hospital or dispensing doctor. The complexity of the distribution depends on the manufacturer's location, nature of special handling requirements, if medicine need to be imported due to geographic location of the end user.

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Transportation is an essential part in the execution of the supply chain. Itprovides the link between nodes. Therefore, transportation capabilities must be integrated with their enabling supply chain structures (Morash& Clinton, 1997). Important decision making in transportation includes modal selections, shipment size, and routing which are all directly related to the location of warehouses, customers, and plants (Webster, 2008). Therefore effective management of a firm's transportation system will ultimately ensure adequate visibility of the firm's orders and shipments along the supply chain.

3. Dispensing to the end user: Providing the correct medicine dosage and form, to the right patient, in a convenient and timely manner is the final step in the value chain. This step can also involve several additional activities, including checking for potential interactions, providing advice, and processing reimbursement claims. Indeed, all these activities are to ensure the patient receives the full benefit and value from the medicines they receive.

In each of these components of the value chain, there are range of costs incurred and value added, as summarized in Fig: 4; Murray Aitken (2016).

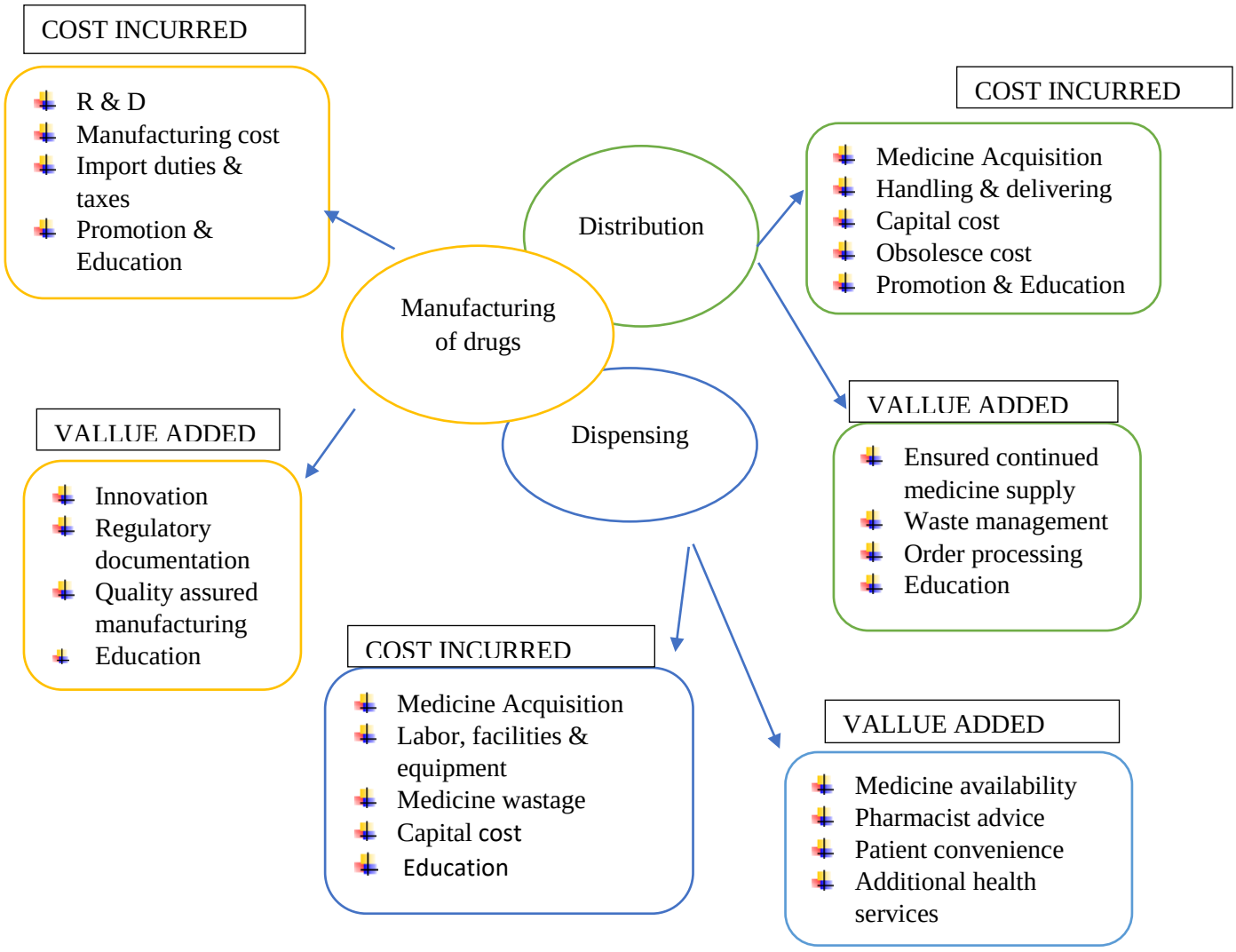

Fig.3: A Generic Pharmaceutical Industry Supply Chain

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Pharmaceutical Value Chain (Adopted from Murray Aitken (2016). (ifpma.org).

With the ever-increasing complexity in the global marketplace, a higher level of supply chain performance is being pursued to deliver better value to both consumers and businesses. However, to reach the proverbial pot of gold, a fully integrated and synchronized supply chain is required (Ian Sewell 1999).

IV. THE PHARMACEUTICAL SUPPLY CHAIN "ON THE WIRE"

The internet has transformed many aspects of the global marketplace, from consumer behaviour to new business models. Mobility, cloud computing, business intelligence and social media underpin how the internet has changed our world. Industries are undergoing digital transformation. While new firms can embrace the digital marketplace straight away, established firms will need to transform how they sell, price, produce and deliver products and services. Real time business intelligence and predictive analysis is required not only for faster decision-making, but to cope with unexpected market risks and opportunities. Banomyong, R (2018). The value of information can be calculated based on the relative value of alternative response strategies and the likelihood that acquiring the information would result in a change in response. Only information that leads to a change in response strategy has any value, and its value is a function of the difference in the values of the alternative strategies. Once the organization knows how to determine what information is valuable, its investments in information gathering become more focus and productive (Haeckel, 1999).

In recent years, social media have transformed the way people communicate by reducing barriers to the exchange of information, increasing both the amount of communication and the number of people who can participate. Health care organizations (e.g. hospitals, health systems, patient associations) have chosen to use social media for both communication and marketing. As health care systems continue to work toward meeting meaningful-use requirements of the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009, pharmacy practitioners struggle to provide meaningful and coordinated database exchanges (interoperability features) that would allow seamless information additions and subtractions among medication-related technology, devices, and related electronic health care systems that rely on accuracy for the safe provision of medicine to patients. Volpe G. et al (2014).Hospital pharmacy services, community pharmacies and clinical pharmacists tend to have several amount of twitter accounts. Helena Esteban-Cartelle,et al (2017).

One study conducted with pharmacists from nine countries revealed that the most used social media among consulted pharmacists were Wikipedia, YouTube and Facebook. Benetoli A, et.al (2016). A posterior publication by the same authors stated that the pharmacists interviewed did not provide individualized services to consumers via social media, despite most of them working in a pharmacy with a Facebook page. They occasionally provided advice and general health information on social media to friends and followers, and more commonly corrected misleading health information spread on Facebook. Also, short YouTube videos were used to support patient counseling in community pharmacy. Benetoli A, et al (2017). Twitter is the second most used social media platform by hospitals in the United States and has been used by organizations to promote health and detect poor-quality health care.One study recently found 672 accounts belonging to emergency physicians; another studyaslo found that just 13 pharmacy preceptors acknowledged creating a Twitter account.Another study identified 12% of pharmacists from a single state as having a Twitter account. More broadly, American Society of Health-System Pharmacists (ASHP) surveys suggest that 25% of pharmacy students regularly use Twitter, 22% of new practitioners have an account, and only about 12% of pharmacists who have been in practice keep an active Twitter account, compared with 13% of the general population. Hajar z et al. (2014).

Pharmacists are in a great position to counsel patients about digital options that can help them make better health decisions. Notable among these options are digital applications. From monitoring a patient's diabetes to reminding individuals about their immunization status, there is, as Apple would tell you, "an app for that."According to Mobile fact sheet 2013, 77% of US adults own a smartphone, while Kaltwasser J. 2019 stipulate thatas major mobile carriers now race to 5G, itis time to embrace this technology as a health care tool. Hennessy M. (2019).These apps can not only save pharmacists and physicians counseling time, as patients turn to their phones for reminders about what vaccines they need, but also provide critical information

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during emergencies. Now is the time to embrace this technology as a health care tool.

These apps can not only save pharmacists and physicians counseling time, as patients turn to their phones for reminders about what vaccines they need, but also provide critical information during emergencies. According to the latest measles number from the Centers for Disease Control and Prevention, from January 1 to December 31, 2019, 1,282 individual cases of measles were confirmed in 31 states. Of these cases, 128 were hospitalized and 61 reported having complications, including pneumonia and encephalitis. However, in May 7, 2020, there have been 12 confirmed cases in 7 jurisdictions. The Jurisdictions here refers to any of the 50 states, New York City, and the District of Columbia. Measles cases and outbreaks. (2019).

In instances like these, apps have the potential, in the future, to deliver up-to-the-minute immunization recommendation. Although social media is important, the pharmacy's commercials are the most successful marketing tool.Mike H. Sr (2019).This improvement in information technology (IT) has reduced the cost and time required for business processes, creating competitive advantages for businesses that know how to use it. The increasing scope of business diversification (facilitated by IT) has led to globalization issues such that businesses now must deal with highly diversified customer groups with different preferences, living within different cultural contexts. Briggs C.(2015).Automated dispensing machines—decentralized medication distribution systems that provide computer-controlled storage, dispensing, and tracking of medications—have been recommended as one potential mechanism to improve efficiency and patient safety, and they are now widely used in many hospitals (Fung E. and Leung B. (2008). Indeed, re-engineering of pharmacy inventory management is long overdue. Technological innovation and better workflow design are improving processes traditionally characterized by manual, error-prone practices, and lack of visibility into existing inventory.

Ultimately, empowered with the right information at the right time, directors of pharmacy can maximize purchases and enhance patient safety through faster and better decision-making. Evidently today, this enterprise-wide medication management model is transforming how health systems view the pharmaceutical supply chain. Advanced Staff, (2016). Improving patient safety is always a key focus in the hospital setting, and pharmacists have been exploring a variety of strategies and technologies to achieve this goal.

Sensing and Responding at the Pharmaceutical Industry

Information technology (IT) capabilities is an imperative for logistics and supply chain sustainability and an important tool for cost containment/reduction, better customer service, increase on returns on asset (ROA) and increase in sense and response to customer and market needs. Haeckel, (1999) emphasized that, adapting organizational context is the key to keeping a business viable in discontinuous change. As with many industries, technology is a major driver as well as, for pharmaceuticals, technology is just about everything.

Recently, the newest technological trends have been with the research and use of stem cells, and the introduction of nanotechnology as a complement to drugs in healing patients. The chemicals and drugs industry have a promising but challenging future. With an aging population consuming three times as many drugs as younger population, worldwide demand is expected to rise.Drug expenditure is expected to triple from 2000 to 2050 and the market value is estimated to be worth $1.6 trillion by 2020. As demand rises, especially in emerging markets, Pharmaceutical companies are increasingly reliant on major technological advances and sharing resources among each other to develop revolutionary medicines. Global Edge. (2019).

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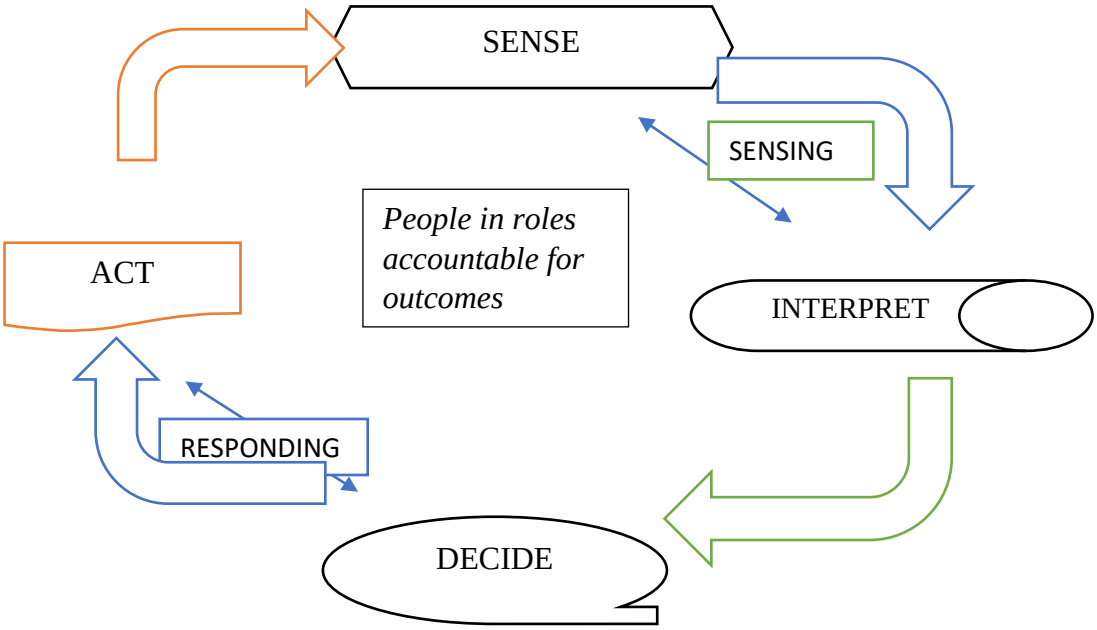

Fig.5: The Adaptive Loop

Adopted from Haeckel, (1999).

The adaptive loop presented in fig. 5 begins with and is fueled by data, and that the system must transform into information and knowledge before it acts.

According to, Bozarth and Handfield, (2008),Information System(IS) is a set of interrelated components that collect or retrieve, process, store and distribute information to support decision making, in an organization. Coyle, et.al (2009), assert that information must be accessible, relevant, accurate, timely and transferable across the supply chain and furtherdescribed supply chain information system (SCIS) as a system that automate the flow of information between a firm and its suppliers to optimize planning, sourcing, manufacturing and delivery of goods and services. While Sanders, (2012), concludes that information technology is the tool that has broken down the barrier of distance between companies and geographic regions.

The Adaptive Decision Process (ADP)

The Adaptive Decision Process (ADP) provides a powerful way to think about the relevance and value of information-gathering activities. Its logical framework can be best described as decision pull, as distinguished from information push. Indeed, an adaptive organization must sense what information can contribute to the development of value-creating strategies. Sense-and-response logistics (S&RL) is a principal tenet of focused logistics that fuses operations, intelligence, and logistics information with the goal of managing logistics events in near real time. The goal is to maximize the readiness and logistics effectiveness and enabling logisticians to accurately observe, orient, decide and act faster than the supported customer. Indeed, the S&RL requires a network-centric enterprise and mandates collaboration within and across communities of interest. In today's information age, to be adaptive, organizations must meet an essential criterion for processing information from an environment, they must be able to translate apparent noise into meaning faster than it arrives. As both noise and potentially meaningful data arrive faster and faster, complex organizations in complex environments need help to sense and interpret event quickly (Haeckel, 1999).For the globally connected and competitive market, the use of information technology (IT) is becoming an effective paradigm. Therefore, to coordinate and synchronize supply chain, firms need information and communication technology as an enabler to achieve a higher level of supply chain efficiency.The absence of coordination and synchronization across supply chain members could lead to inadequate performance, therefore adopting information and communication technology (ICT) as an enabler will reduce the inadequacies and inefficiencies that relates to poor

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information processing and sharing.To become more competitive, innovative, and adaptive, it is imperative that organizations embrace information technology for improved performance.

There are several functional roles of IT in supply chain management (SCM) suchas:Customer relationship management, Firm, Procurement, Operation, Logistics andVendor relationship management.I mprovement on customer satisfaction can lead to better service and lower cost. Logistics information systems create and manage the informational flows in the network. Order management systems, warehouse storage and retrieval systems, transportation scheduling and package routing systems, and even tracking systems like the one UPS uses to track shipments are all part of the logistics information system, Bozarth & Handfield, (2008). Indeed, an efficient and effective use of IT can reduce cycle time, reduce parts inventory, work in progress and finish goods in the pipeline, increase the accuracy and competitiveness of filling a customer's order (Mehdi, et al 2008). Bakos and Brynjoolfsson, (1993) posit that, the development of IT in supply chain could lead to closer buyer-supplier relationship. Studies has shown that, successful supplier-buyer relationships are due to efficient and successful information sharing. Stump and Sriram (1997), stipulate that the use of IT is associated with the overall closeness of buyer-supplier relationship. Grover, et al. (2002), argue that the decision to use IT within the firm encourage the commitment to establishing relational behavior. They further conclude that IT decreases transactional costs between buyers and suppliers and creates a more relational/cooperative governance structure.

The utilization of ICT is one of the most important modes for improving the quality of healthcare services in both developed and developing countries. However, since 2006, the Malawian Ministry of Health for example; in collaboration with Baobab Health Trust and Luke International, two non-governmental organizations (NGOs) operating locally, have begun investing in ICT solutions by installing electronic health record (EHR) systems in health facilities throughout Malawi. World Health Organization (WHO) (2013), and Centers for Disease Control and Prevention (CDCP), (2014). Mastellos, Nikolaos, et al (2018).These EHR systems intend to improve patient outcomes by supporting the management of supplies, helping clinicians in the delivery of care, also providing robust patient-level data for stakeholders. David Bell, et al., (2018), explores the future of computerized clinical decision support systems (CDSSs) for primary health care in low-resource settings. They stipulate that advances of CDSSs in various settings, using the growing availability of big data in clinical decision-making, open a radical technological approach that could enable countries with poor health infrastructure to capitalize on the information revolution transforming other sectors of society (Celi LA, 2014). By integrating clinical and local epidemiologic data, with improved medical record systems, and improving digital linkages within and between clinics, a system that employs dynamic clinical algorithms (DCAs) could optimize the clinical care of patients, incorporating relevant data from all levels of the health system into decision-making in primary care consultation (David B, et al., 2018).

Moore et.al (2005), in their research on "trends and issues in supply chain management" identified six drivers of excellence as represented in fig. 6:

1). Collaboration, 2). Visibility, 3) Connectivity, 4) Optimization, 5) Execution and 6) Speed, in adaptive enterprises and recognized the link between information technology and excellence. They stated that: firms that have real-time or near real-time information about a products, customers, and order fulfillment across the supply chain are more effective and deliver customer service that surpasses their competition. Then went further to confirm that these technology-assisted drivers of excellence when executed properly, generates adaptive capabilities, help synchronize high-velocity supply chains, and serve as valuable weapons in the ongoing battle for competitive advantage. Coyle et.al (2009**).**

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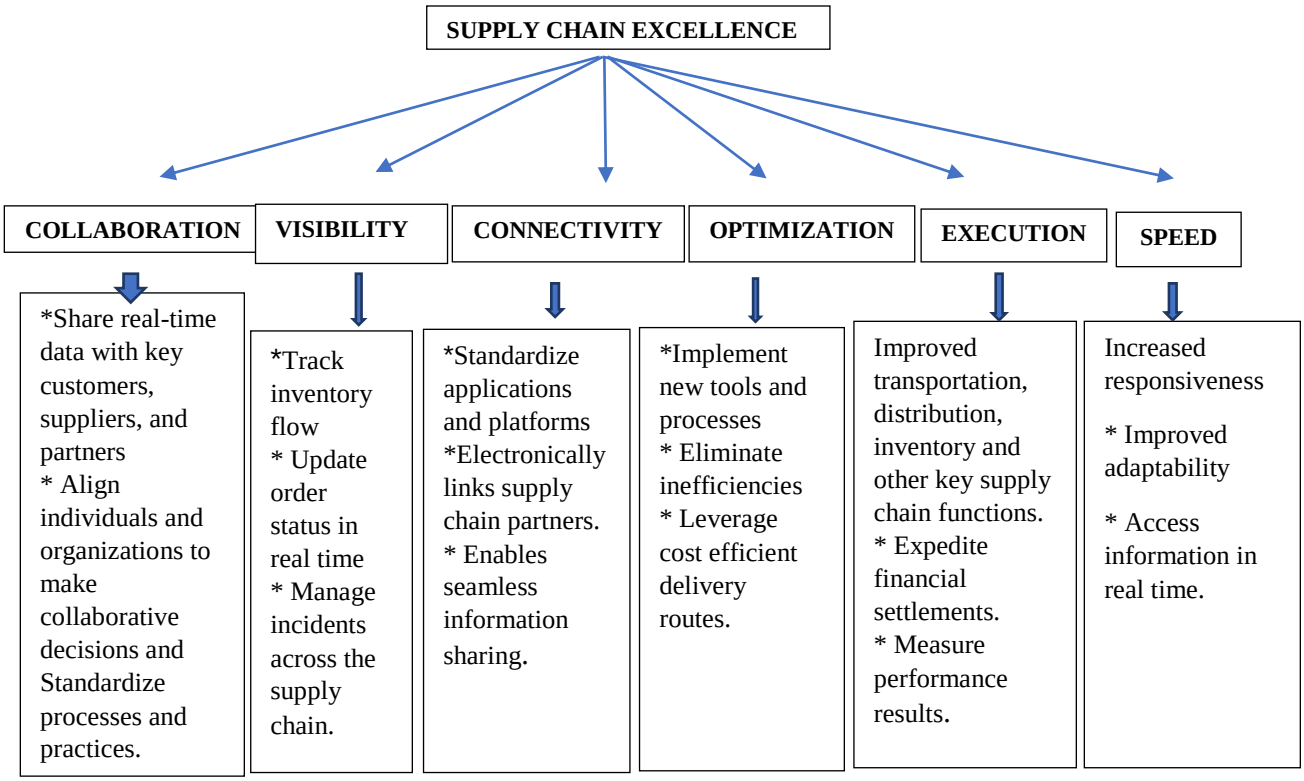

Fig.6: Six Drivers of Supply Chain Excellence

(Adopted from Moore et.al (2005) Information Technology supports the pursuit of these drivers, facilitating the evolution to highly coordinated, dynamically responsive supply chains.

V. RADIO FREQUENCY IDENTIFICATION (RFID) AND SENSOR TECHNOLOGY

Faced with a rising tide of counterfeit and mispriced drugs, pharmaceutical companies are turning to technologies such as RFID to better track medications through the convoluted supply chain.To fix this problem, pharmaceutical companies are under increasing pressure to plug holes in their supply chain, particularly in the distribution network that runs from manufacturer to customer. For instance, several US states are now mandating that companies confirm the authenticity of their product by creating a "pedigree" that vouches for a medication's origin and who else has handled it. The FDA has recommended that pharmaceutical companies start using radio frequency identification technology (RFID) as a means of better tracking drugs. As a result, most pharmaceutical companies are experimenting with RFID, or at least using bar codes or other technologies such as Web portals that can help track and authenticate the drugs. Patton S. (2007).

Some of the IT tools commonly used include: Electronic data interchange (EDI), Electronic Fund Transfer (EFT),and Electronic Product Code (EPC),which defines the RFID tag data structure and allows unique identification of manufacturer, the products and individual items that belongs to that product. barcode and radio frequency identification (RFID). Indeed, technologies such as RFID is increasingly in use in pharmaceutical and healthcare systems.Radio Frequency Identification (RFID), infrastructure describes the IT infrastructure which is necessary to collect, filter and enrich raw RFID data before being processed by the backend systems (i.e., business intelligence systems like

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ERP)Floerkemeier C, and Lampe M, (2005). The basicRFID system is composed of three main elements: the RFID Tag which contains data that uniquely identifies an object, a RFID Reader which reads and writes the data on the tags and finally, a backend database which is used to record the data collected by the tag readers.Potdar M, et al (2006).The RFID Reader in turn send radio waves to the RFID tags, to enquire about their data contents while the tags respond by sending back the requested data. The readers having some processing and storage capabilities is linked via the RFID middleware with the backend database, to do any other computationally intensive data processing. However, the RFID middleware, is designed to provide the messaging, routing, and connectivity for reliable data integration with existing backend systems such as Enterprise Resource Planning (ERP) Systems and Warehouse Management Systems (WMS). Finally, the backend database, stores the complete record of RFID items. It maintains the detailed item information as well as tag data, which shall be consistent with the one read from the RFID. Leaver S. (2004).

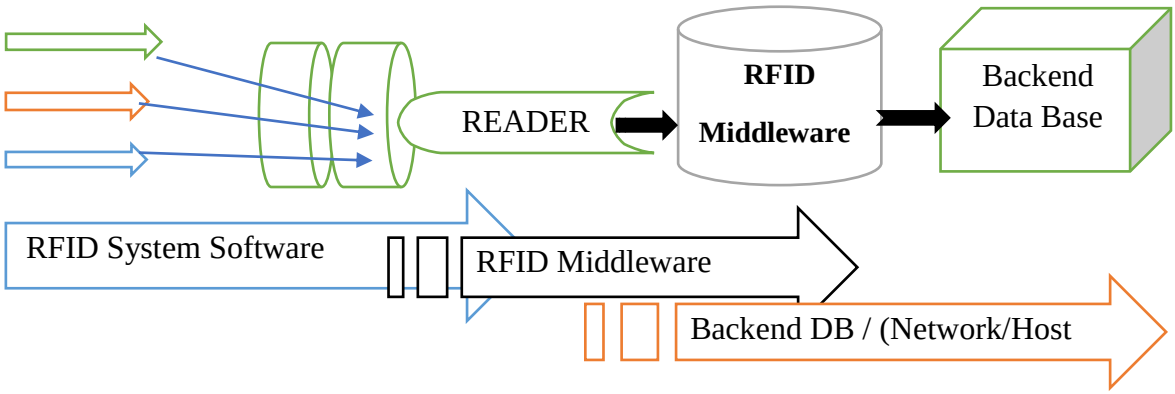

Fig.7: RFID Tag

FIG. 7. Shows the Relationship between RFID Tag, RIFD Reader, RFID Middleware, and Backend Database. The phases of RFID Processing include: 1. Collecting data through the RFID reader, 2. Using the collected data for further use, 3. Finally exchanging data with backend systems.

The technical characteristics of RFID weather Passive or Active are distinct technology substantially different capabilities but often considered and evaluated together. Passive RFID is most appropriate where the movement of tagged assets is highly consistent and controlled, and little or no sensing capability or data storage is required. Active RFID is best suited where business processes are dynamic or unconstrained, movement of tagged assets is variable, and more sophisticated security, sensing, and/or data storage capabilities are required. Savi Technologies (nd).Although slowly adopted, the RFID technology seem to a more reliable, however, the use of two-dimensional bar coding has been a widely form of electronic identification used in the pharmaceutical industry. Ajami S and Rajabzadeh A. (2013). Indeed, the implementation of RFID technology in the pharma industry has some noted advantages: accuracy, scalability, productivity, increased customer satisfaction and potential for higher return on investment (ROI). Alberto C. et al (2016).

Several uses of RFID in the Pharmaceutical Industry include but not limited to:

1) Used to create electronic drug pedigrees (e-pedigrees) instead of the current manual ones. E-pedigrees are auditable electronic documents that provide the distribution history of a drug, including the dates of sales, purchases, or trades as well as the parties associated with each transaction and helps to ensure authenticity of the medication through the supply chain.
   Tailor D.(2014).
2) RFID technology, through automatic identification, can detect and avert errors during medication administration and has penetrated through the healthcare system. Ajami S., Rajabzadeh A. (2013).
3) Use of RFID has been estimated to decrease risk across the healthcare continuum in a variety of ways. Trible D (2010).

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4) RFID tags in the pharmaceutical industry have helped to reduce the adverse effects associated with patient noncompliance.Alberto C. et al (2016).
5) RFID can track the location of recalled medication within the supply chain.Kavilanz P (2010).
6) RFID tags combined with "smart shelves," automated cabinet or robotic dispensing, and other inventory management tools help to identify drugs that have been recalled by reading lot numbers.Violino B. (2005).
7) Using RFID technologies to improve patient safety and satisfaction can help to decrease malpractice claims, reduce the number of dispensing errors, and help to control the rising costs of healthcare. Mello M. et al. (2010).

Advances in RFID and sensor technologies' ability to communicate with each other in a network environment are redefining the concept of visibility throughout the supply chain. These "sense and respond" networks can help improve the security, quality, and integrity of products moving through the supply chain.Information Communication Technology (ICT) applications in healthcare is as important as advances in diagnosis and treatment.ICT enables access to clinical knowledge which leads to better quality healthcare. Indeed, disseminating information and knowledge management with ICT empowers all stakeholders. This ultimately improve outcome and more cost effective, than only developing better drugs, better surgical procedures, or improved diagnostics. K. Ganapathy (2011). In July 2019, the U.S. Food and Drug Administration signed a six-month project with a technology firm, as well as drug companies and hospitals, to study the value of data captured from UHF RFID-tagged injectable drugs as they move from the manufacturer to a patient. The study is to measure the effectiveness of using RFID technology to improve drug traceability and verification in the supply chain. The six-month pilot will test an alternative technology for meeting the requirements of the FDA's Drug Supply Chain Security Act (DSCSA)—namely, RFID—with UHF tags applied to the packaging of drugs, which are read as they move through the supply chain and are compared against traditional 2D barcodes. The pilot will leverage both the 2D barcode monitoring technology commonly in use, as well as RFID, so both methods can be evaluated, compared, and analyzed. The goal is to identify whether RFID could provide use cases for greater drug supply chain visibility. The Pharmaceutical traceability technology firm "Kit Check" recommended the pilot to the FDA and is providing the testing of UHF RFID tag reader, as well as related data, in partnership with the Hackensack University Medical Center, Coral Gables Hospital, Nephron Pharmaceuticals and Novartis. It is stated that the pilot will show that RFID, a non-line-of-sight technology, can reduce aggregation errors in the supply chain for serialization, provide efficiency on the product flow in the supply chain, and assist hospitals with utilizing DSCSA-required data in recall situations. Swedberg, C (2019). Also, in April 2020Pharmaceutical label company Schreiner MediPharm teamed up with Kit Check to release a technology-based solution that includes Schreiner MediPharm's customizable UHF RFID-enabled labels, known as RFID-Labels, and Kit Check's reader stations and management software. The system is intended to help drug companies, hospital pharmacists and healthcare providers automatically track injectable drugs from manufacture to administering and thereby improve drug safety. Swedberg C. (2020).

Pharmaceutical Supply Chain Security

Schumpeter first introduced the phrase disruptive technology in 1942 as "creative destruction, a process where radical innovations create major disruptive changes in a market or in a whole industry. There are two distinct categories of technology: sustaining and disruptive technologies. According to business dictionary, disruptive technology is the "new ways of doing things that disrupt or overturn the traditional business methods and practices. Disruptive technology is expressed as a completely new technology or new ways of doing things that replaces or disrupts an existing technology or overturns a business traditional methods and practices. While sustaining technologies are technologies that enhance the performance of a product. Bower, J. L., & Christensen, C. M. (1996). Indeed, Bower & Christensen, further posit that, although disruptive technologies, are the problems of large companies, most large companies are familiar with sustaining technologies and are inclined in turning sustaining technologies into accomplishments. The real threat and opportunity in technology's disruption lies in the evolution of customer and employee behavior, values, and expectations.

"A disruptive technology is one that displaces an established technology and shakes up the industry or a ground-breaking product that creates a completely new industry". Solas B. (2014). Technology represents new ways of doing things, and, once mastered, creates lasting change,

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which businesses and cultures do not "unlearn." Adopted technology becomes embodied in capital, whether physical or human, and it allows economies to create more value with less input. At the same time, technology often disrupts, supplanting older ways of doing things and rendering old skills and organizational approaches irrelevant.

On November 27, 2013, President Obama signed into law the Drug Quality and Security Act (DQSA), P.L. 113-54 (27 Stat. 587). P.L. 113-54 contains two separate titles: Title I address drug compounding and is known as "the Compounding Quality Act," and Title II is known as "the Drug Supply Chain Security Act" (DSCSA). The DSCSA enhances the security of the pharmaceutical supply chain by establishing a national system for tracking, tracing of prescription drugs, and serializing pharmaceutical products and for establishing national licensing standards for wholesale distributors and third-party logistics providers. The DSCSA is a huge step forward in reducing potential threats to supply chain security and patient safety associated with pharmaceutical distribution. Public Law 113-54 (2013)**.** These rules replace the previous differing state rules and regulations concerning the pharmaceutical supply chain and standardize the US market's track-and-trace rules. The DSCSA outlines critical steps to build an interoperable electronic system by November 27, 2023, which will identify and trace certain prescription drugs as they are distributed in the United States, facilitating the exchange of information at the individual package level about where the drug has been in the supply chain. US. FDA (2013).

With the example of DSCSA, according to Kevin A. Clauson et al (2020), each regulatory component should map to blockchain capabilities for it to be a viable solution. In the case of the pharmaceutical supply chain, possible DSCSA-blockchain policy and technology alignment is illustrated in Table 1. below:

Table 1. Blockchain applicability for DSCSA key requirements:

Key Requirement	**Blockchain Applicability**	**Compatible**
Product identification	Unique product identifier can be required with contributed information validated as a side chain	YES
Product tracing	Allows manufacturers, distributors and dispensers to provide tracing information in shared ledger with automatic verification of important information	YES
Product verification	Creates system and open solution to verify product identifier and othercontributed information	YES
Detection and response	Allows public and private actors to report and detect drugs suspected as counterfeit, unapproved, or dangerous	YES
Notification	Creates shared system to notify FDA and other stakeholders if an illegitimate drug is found	YES
Information requirement	Can create shared ledger of product and transaction information including verification of licensure information	YES

Adopted from Blockchain in Healthcare Today.

This new system will enhance the FDA's ability to help protect US consumers by improving detection and removal of potentially dangerous products from the pharmaceutical distribution supply chain. Coustasse et al (2016).On Jun 2020,Systecha division of Market-Imaje specializing in serialization solutions, as announced a cloud-based software solution for the serialization of pharmaceutical products. They indicated that the cloud-based system allows pharmaceutical products to be serialized according to a country's national requirements. However, the procedures is for collecting, storing and transmitting product data across the supply chain and that, the serialization will involve preventing counterfeiting and diversion of products, but it has not been enough to prevent criminals from taking action.

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As a result, other technologies such as: fingerprinting, Systech's UniSecure mobile solution, holograms, tamper-resistant seals, and special inks are added as extra protection to each product. They concluded that serialization affects all partners in the supply chain: brands, contract manufacturers, packers, logistics providers, distributors, hospitals, and pharmacies. Perin E. (2020).Various international and national health organizations, including the American Medical Informatics Association, expressed the urgent need for health organizations to have information systems that improve the quality, cost-effectiveness and safety in patient care. Leape L L, Berwick D M. (2005) and Kane-Gill S L. et al (2017).

Generation Y is a group that is extremely social, incessantly connected, and highly demanding. They want to get things done, and they want to use any device that will help them get it done. Bremmen, (2013). Organizations that have succeeded in engaging with Generation Y know that, as well as accelerating the take-up of new digital technology, they pose additional challenges due to their evolving expectations. Generation Y are best thought of as an evolving mindset and are today, the catalysts and the incubators of change, but each day their influence is growing in consumer and corporate environments, meaning that organizations must learn to engage effectively now, or risk being shut out of the game. To attract these young people, both as consumers and as employees, a company cannot just look good – it must be good. The proliferation of digital channels, platforms and devices has produced a generation who are born 'plugged-in'. This 'Generation Y' already plays a major role in accelerating the emergence of a new, digital world, and their impact is impossible to ignore. Briggs C. (2017).

Stages of the pharmaceutical value chain and IT applications

IT applications provides several benefits which include but not limited to improving customer services, human resources efficiency, total efficiency if more time are allocated to more value adding business activities, information quality and supporting collaborated planning and consequently improving the agility of the supply network.

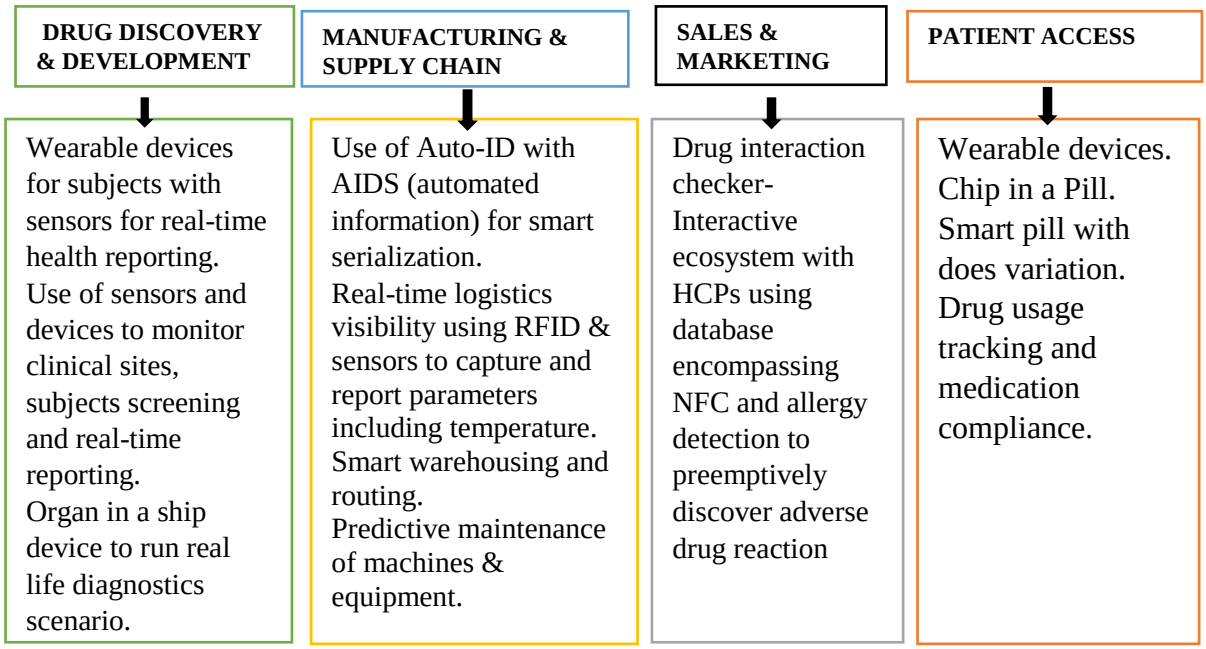

Fig.8: Pharmaceutical Value Chain and IT Applications

The major stages of the pharmaceutical value chain in figure 8 begin with drug discovery, drug development, manufacturing, distribution, sales, marketing, and patient access. In addition, organizations face more risks in an electronic supply chain including delay, system breakdown, lack of information security etc. Rajab-Zadeh A, et al (2011).

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Figure 9 selectively list applications and benefits of Information Technology to Pharmacy Supply Chain. Despite the benefits, there are still some difficulties in the IT application, for example: changing the business processes and business relations to adapt to the new IT environment.

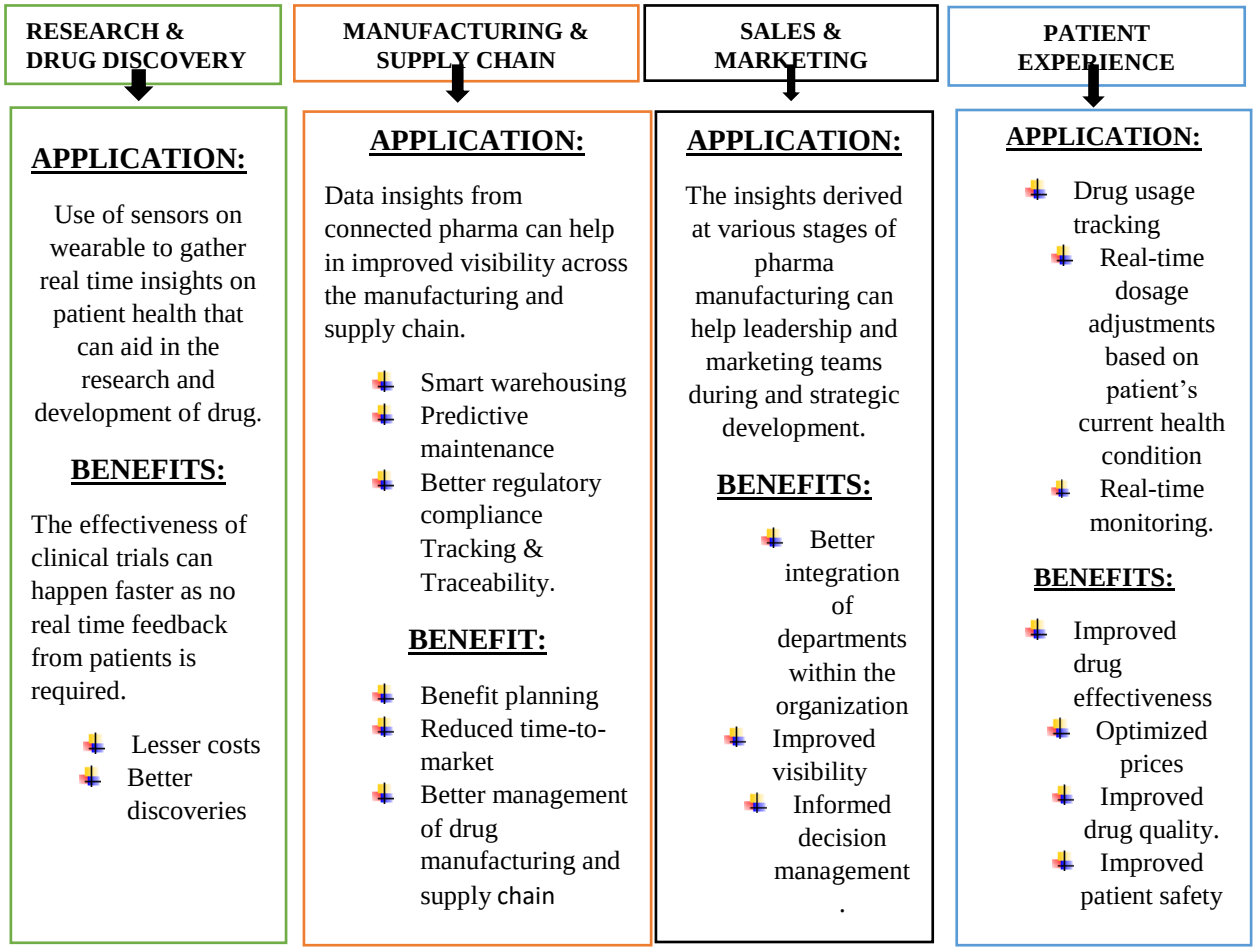

Fig.9: Applications and Benefits of Information Technology to Pharmacy Supply Chain

Electronic Prescribing Systems (EPS), automate prescribing, supply, and administration of medicines in hospitals. Barcode identification of medicines, are used in conjunction with the Electronic Prescribing System, this help to reduce errors in medication prescriptions, that lead to safety of patience while electronic ward cabinets provides benefits such as reducing number of missed doses, supply delays, stock outages, reduction of stockholding and wastage. However, a poorly implemented electronic prescribing system may create errors. The use of computerized physician order entry has significantly increased accurate medication dosage and decreased medication errors. The use of clinical decision support systems has significantly increased physician adherence to guidelines, although there is little evidence that indicates any significant correlation to patient outcomes. Research shows that interoperability and usability are continuing challenges for implementation. Weigel F. K et al (2015). Falsified Medicines Directive (FMD), is used to combat counterfeiting at the point of dispensing. Automated dispensing: Although robots have been used in logistics, manufacturing, and distribution for several years, but adopted and used recently in pharmacy. Various technologies are now available to support approaches to adherence monitoring.Clinical

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applications of e-Health include: Electronic Health Records, TeleConsultations, Clinical Decision Making Support Systems, Vital Signs Monitoring Services, TeleHomeCare, Ambulatory e-Health—smart clothing, e-Wear, e-Clothing, ePre-scribing, e-Nursing, e-dissemination of personalized healthcare and professional Continuing Education, using e-Learning tools such as: Health Information Systems, LifeTime Health Records/EMR, Pharmacy Information Systems, Electronic Claims Systems, Laboratory Information Systems, Interfacing with Diagnostic Equipments, ICT in Health Administration, and Identification and Tracking Solutions. Ganaphathy K. (2011).

Today, patients have more power than ever before to review potential treatment plans, consult second opinions, and get into contact with patients similarly affected, without leaving the comfort of their home. Several free app such as DementiAssist (Baylor Scott and White Health, Dallas, Texas allows a patient to view list of triggers for several behavioral acts which will enable the family to select the best clinical treatment for the patient. Husain I.(2015).There are several useful diagnostic and treatment apps but not limited to: the new Apple Watch (Apple Inc, Cupertino in California) that utilizes data recorded from your wrist to monitor heart rate and blood pressure, blood glucose levels, sleep apnea, and even ABCD2., (*ABCD2 is a validated, seven-point, risk-stratification tool to identify patients at high risk of stroke following a transient ischemic attack (TIA)* and Congestive heart failure, Hypertension, Age 75 years Diabetes mellitus, previous Stroke, transient ischemic attack, or thromboembolism, Vascular disease, Age 65 to 74 years, Sex category (CHA_2DS_2-VASc) scores *(CHA_2DS_2-VASc is used to assess stroke risk in atrial fibrillation)*—all synced to the Cloud to create an online, personal health profile, accessible on several devices. Husain I(2015).

Several vendors have developed "smart" packaging, where a microchip-containing tablet blister pack is able to monitor when doses are popped out (not necessarily taken) and prompt the patient to record side-effect monitoring information for the medicine in question. These data can then be transmitted to a mobile telephone or tablet device. A more invasive adherence monitoring technology is the "smart" pill. This consists of a sensor pill, ingested by the patient, which transmits data on doses taken, heart rate, body posture to a mobile telephone or tablet device, via a receiver patch on the patient's skin. At present, this is available only as a dummy pill, but eventually it will be incorporated into medicines. Telecare also involves the use of digital communications technology (audio and visual) to provide healthcare consultations and services to patients remotely at home. Telecare has various potential benefits: it puts patients at the center of their care and supports personalized medicine; it improves access to healthcare by reducing the need for hospital attendance. However, the exact benefits provided by telecare vary between different applications and care scenarios, and, at present, the literature suggests that more evidence of outcome benefits, and more cost-effectiveness data are required to justify further investment in telecare.

There are specific I T solutions for various stages of the pharmaceutical value chain. Solutions such as electronic data capture for drug development, enterprise resource planning for manufacturing and sales force automation for sales and marketing are few examples. Information Technology (IT) adoption in a pharmaceutical company can be characterized by four different levels. The level 1 companies have only department-specific solutions, which automate a single department and are not integrated. While the implementation of IT solutions in level 2 companies is integrated into multiple functional areas. Such as; an ERP solution which integrates the company's financial, manufacturing, sales and human resources department, is a typical example of level 2 companies. Solutions such as business intelligence, data warehousing, data mining along with the enterprise-wide solutions for instance SCM, form the IT set up of the level 3 companies. These solutions assist the company to make informed decisions after extensive data analysis. Then the level 4 companies are totally automated with the help of solutions such as enterprise application integration. Sourabh K (nd).

One of the most important objectives companies need to focus on is building agile supply chains. In effect, this will give companies direct contact with patients. This new approach will allow greater commercialization as companies refocus their sale and marketing strategies that will support in creating valuable products. Advances in technology will allow pharmaceutical and medicine manufacturers to make time conscious innovations.In pharmacy, use of remote consultations, together with EPS release and an internet pharmacy supply service, could transform the way that pharmacy services are provided. Goundrey-Smith, S. (2014).However, companies must work together and share resources to increase research and development efficiency to mitigate cost. The future success and major profits lie within the hands of companies willing to make bold moves and alter traditional strategies. Hospitals

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and health systems are beginning to tap into the ignored opportunity: "pharmacy supply chain optimization".

VI. SUMMARY AND CONCLUSION

Business such as healthcare will have to reorganize and continue to modify their business-model to capture potential benefits on emerging technological innovation that can positively affect patient care and costs.Improving efficiency for a speedy ROI in every stage has become a critical factor to ensure the success of the company. Strategic adoption of Information Technology (IT) is also essential to speed up the process of research, development, and sales of drugs. Mounting focus on drug discovery has led to an exponential growth in creation of intellectual property (IP).

In such a scenario, pharmaceutical companies have come to realize the importance of IT solutions. They have started implementing knowledge management solutions for data management and security solutions to protect their IP. ERP solutions are also being implemented for optimizing the use of resources and maximizing returns. The pharmaceutical companies are using the Internet technology for web-based data capture, mining, reporting for clinical trials, eDetailing and eSampling for sales and marketing.

This new age of savvy healthcare consumerism has opened doors for a new stage of medicine, one in which patients play the leading role. It is no secret that educated patients are empowered patients, and with Google enabling the common public to research their diagnosed conditions and learn about potential treatment options, patients now have the tools to be more empowered than ever before. Studies have documented better clinical outcomes, and perhaps better decision making, in patients who are able to self-manage and incorporate lifestyle changes to accommodate their diseases. Adam R.J. (2010),and many of the latest apps are making it easy for patients to do just that. We can only imagine the potential of such broad-reaching health education for preventive medicine. But although it is easy to hear about the future of medicine that lies within the World Wide Web, it is often difficult to see the results of such advancements on a community scale, especially in underdeveloped and less educated areas.Amit Om Ms3(2015).

As the United States adds, more stringent regulations and environmental controls, pharmaceutical companies are struggling to comply. While these factors affect different aspects of the pharmaceutical and healthcare realms, companies are evaluating their options and taking a strategic look at their current supply chain approach.Although considerable effort and expense has been expended to innovate, develop, and market medications more efficiently, there has been only minimal effort to reconfigure manufacturing and distribution operations or adjust the pharmaceutical supply chain network. Industry experts report that most pharmaceutical companies have complicated supply chains that are inefficient, under-utilized, and ill-equipped to deal with the products that are being introduced. Datexcorp (nd). Indeed, leading-edge technology will continue to rapidly advance and be incorporated into the pharmaceutical supply chain process. However, government policies on data management or governance, privacy, security, ethics, and human retraining are lagging and will need faster improvement. To efficiently manage the consequences of using information technology requires more knowledge of information technology.Technology knowledge must be coupled with improved critical thinking and communication skill integrated into strong ethical base to help the pharmaceutical industry continue to thrive in the "NEW WORLD ORDER" Rod K. (2020).

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Conditional Cash Transfer (CCT) Program: Students Perception and Challenges in their Academic Performance

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Abstract**—** *This study focused on conditional cash transfer (CCT) program implementation to the student-recipients in the five selected public secondary schools in a certain Congressional District in the Division of Nueva Ecija, Philippines. The data gathered revealed that the amount of Php500 (10U$) CCT cash grant is insufficient for the respondents' school needs and most of the time this amount had been used for the food budget of the family. This resulted in absences and non-compliance to school activities and requirements of the students which negatively affect their academic performance.*

Keywords**— Academic performance, absences, conditional cash transfer, secondary school.**

I. INTRODUCTION

The conditional cash transfer (CCT) also known as 4P's program is one of the programs implemented in the Philippines under the Department of Social Welfare and Development (DSWD)[1]. The program was commonly known as Pantawid Pamilyang Pilipino Program or simply 4P's that transfer cash to poorest of the poor families on the condition that their children attend to school and visit a health facility for health check-ups and services, such as growth monitoring and vaccination, attend to family improvement seminars and such services offered by the government [2].In general, CCT program is a social program agreement wherein the government provided financial funds and recipients obliged to the fulfillment in an exchange of certain task of securing their children attendance in school, attendance to family development sessions (FDS), regular health check-up in the nearest community health center, active participation in any government-sponsored program like feeding and community cleaning programs and securing attendance in more specific trainings and livelihood programs[3].

Taberna (2012) [4], stated that the beneficiaries of 4P's are the poorest of the poor and 1,400, is and it will be a big help for them although it may not be enough. Additionally, it also says that the maximum amount of cash grant represents only 7 percent of the beneficiary household's average income prior to its receipt [5]. Alongside the positive experiences with the program, are the criticisms of CCTs. One of these is paternalism: imposing conditions to change the behavior of the poor implies that the poor are unaware of what is beneficial to them, and cash incentives are necessary for them to act on what is to their best interest [6]. A limitation of most CCT evaluations is that the program under study is relatively new, and the behavioral changes were measured while the participants were still in the program [7].

However, in reality, this program cannot guarantee its complete effectiveness among its beneficiaries because there are some who are using the money in another means instead of its actual purpose which is for the educational needs of the students resulting in their performance and school attendance to suffer[8]. As the researchers' personal experiences and observations in day to day activities of students who are 4P's members had poor class attendance and had difficulties to comply in different school activities and projects because of their reasons for financial problems.

It cannot be denied that all public schools from elementary to senior high school offered free education for all. It is a great privilege and opportunity for all learners to be educated particularly those who under the senior high school wherein the knowledge and skills they will acquire, will have great use for their future. Senior High School offered different track/strands depending on the program offered by the school

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to cater to the varied needs of the students[9]. With this, there will be no reason for the youth not to go to school. But even though that there are learners not attending their class regularly and had a poor academic performance the government still finds ways to help the poorest of the poor to sustain the educational needs of every child even in small financial assistance[10]. The researchers come up with this study to determine the perceptions and challenges encountered by conditional cash transfer student recipients. Specifically, this study sought to: determine the socio-demographic status of the respondents; describe the Conditional Cash Transfer (CCT) Program; and determine the challenges encountered by respondents on the use of the cash grants.

II. METHODOLOGY

This study utilized a descriptive research design to gather data relevant to answer the problem of the study. In selecting the sample respondents, the researchers used a purposive sampling technique [12]. A total of 108 grade 12 students, 15 advisers, and 5 coordinators were selected as respondents coming from five selected public secondary schools in a certain Congressional District in the Division of Nueva Ecija, Philippines. The data coming from advisers and coordinators were used for validation purposes. A survey questionnaire and unstructured interview served as the instrument to gather the data. These were personally designed, developed, and validated by the researchers. The questionnaire was accompanied by a letter stating the purpose of the survey and was personally administered by the researchers. The respondents were briefed on the significance of the survey so that the researchers would elicit honest responses from them. The data were then tabulated and analyzed thru data analysis using frequency count and percentage.

III. RESULTS AND DISCUSSION

1. Socio-Demographic Profile of the Respondents

The majority of 4Ps student-beneficiaries were female, aged 16 and 17, attended their class twice and thrice a week with Php41.00 (U$0.82) to Php60.00 (U$1.20) daily allowance. Household size is five for every family. As to their parents' occupation, most of them were drivers and construction workers who earned a monthly income which was found to be below Php10,000 (less than $200). Most of them reached secondary education.

2. Conditional Cash Transfer Grants

2.1. Respondents' Perception in the Utilization of CCT

The survey conducted to the students regarding their perception in the utilization of CCT cash grants where 89 (82.41%) answered "sometimes" that their parent spent money on other (unnecessary) expenses for their own satisfaction like vices, but despite this suspicion, they still eat meals three times a day 92 (85.19%). All 108 (100%) of them said that Php500 is not enough to support or sustain their educational needs because of some school projects and activities. They even disclosed that their transportation allowance is insufficient, and a great part 97 (89.81%) are discontented with the amount of money that they are receiving from the CCT program. However, 88 (81.48%) said that the cash grants are a big help too as this lessens their burden in money in going to school.

Furthermore, almost half 75 (69.44%) of the recipients have other sources of allowance coming from their parents' income that helps sustain their educational needs. They also claimed that CCT programs have become ineffective in helping them attend their classes regularly.

Table 1.Respondents' Perception in the Utilization of CCT

Do you think that the CCT being received by your parents is spent on other expenses instead of food and educational needs?	**f**	**%**	**Do you think that the CCT cash grant is really helpful to a student like you?**	**f**	**%**
Always	9	8.33	Always	88	81.48
Sometimes	89	82.41	Sometimes	0	0
Never	10	9.26	Never	20	18.52
Total	108	100	Total	108	100

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Does your family eat three (3) times a day?			**Aside from the CCT cash grants, do you have any source of allowance?**		
Always	92	85.19	Yes	75	69.44
Sometimes	16	14.81	No	11	10.19
Never	0	0	Others	22	20.37
Total	108	100	Total	108	100
Does the CCT allowance of Php 500.00 is enough for your educational needs?			**Do you think that the CCT program really helps you to attend your class regularly?**		
Always	0	0	Always	11	10.19
Sometimes	0	0	Sometimes	0	0
Never	108	100	Never	97	89.81
Total	108	100	Total	108	100
Are you contented with the amount of money that you are receiving from the CCT program?			**Does the CCT program help you to improve your academic performance?**		
Yes	11	10.19	Yes	11	10.19
No	97	89.81	No	97	89.81
Total	108	100	Total	108	100

3. Academic Performance

Table 2 shows the data on the academic performance of student-respondents based on their final rating during the 2nd Semester of S.Y. 2019-2020. It shows that less than half or 42 (38.89%) of them got a final average that ranges from 75-79 interpreted as "fairly satisfactory" based on the Department of Education school form number 9. This may imply that the CCT cash grants had an effect on student's attendance because of their common reason for missing their classes due to lack of money to support their educational needs.

Table 2. Students' Academic Performance

Academic Performance	Frequency	Percent	Verbal Description
90-100	19	17.59	Outstanding
85-89	29	26.85	Very Satisfactory
80-84	18	16.67	Satisfactory
75-79	42	38.89	Fairly Satisfactory
Below 75	0	0.00	Did not meet Expectations
Total	108	100	

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4. Challenges of 4P's Recipient-Students in Utilization of CCT Cash Grants

Interviews conducted with the students further reveals that the main problem encountered [13] by majority or 97 (89.81) of the respondents are using CCT cash grants for their educational needs such as buying school supplies and materials, school uniforms, transportation expenses, and meal allowance. This is aggravated more because they still have to pay for school projects and some voluntary contributions. The cash grant allowance intended for this goes to buy food instead. They also claim that their parents have to spend, too, to satisfy their vices.

Conversations with their advisers and 4Ps school coordinators validate the claim of the students to be true because of the frequent absences these students committed, and the informal talks they had with them. This has led to their poor academic performance of students, they said.

IV. CONCLUSIONS AND RECOMMENDATIONS

Most of the student-respondents were female, 16 and 17 years of age, attended their classes twice, and thrice a week with Php41.00 (U$0.82) to Php60.00 (U$1.20) allowance daily. Parents' educational attainment was mostly secondary level, while engaged in menial jobs with monthly income below Php10,000 (less than $200). The average family size is five.

As to respondents' perception of CCT grants disclosed the amount was not enough to sustain their education, and they had the feeling that their parents had to spend still for their vices that had aggravated more the situation, other chunks of the earnings go-to food for the family.

Poor academic performance of students may be correlated to the parents' lack of resources.

It is recommended that the government may continue to support the program to help the students in their education, but with stricter policies to be effective [14]. This action is crucial for the country's economic growth and poverty reduction apparently cited in [15]. And also the DSWD should impose strict monitoring compliance of the school attendance as well as students' academic performance. Further, strict monitoring of the educational cash grants of students solely for this purpose. Moreover, student-recipients must be trained to face their challenges in order for them to solve meaningful problems and develop their higher-order thinking skills as they grow older [16], as cited in [17]. Lastly, the teachers, advisers, and 4Ps coordinators will have to continue helping students in their academic needs, emotional and spiritual side included, short of monetary school requirements to further ease their burden because of lack of money.

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3d Modelling of Structures using terrestrial laser scanning technique

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Abstract**—** *In recent times, interest in the study of engineering structures has been on the rise as a result of improvement in the tools used for operations such as, As-built mapping, deformation studies to modeling for navigation etc. There is a need to be able to model structure in such way that accurate needed information about positions of structures, features, points and dimensions can be easily extracted without having to pay physical visits to site to obtain measurement of the various components of structures.*

In this project, the data acquisition system used is the terrestrial laser scanner, High Definition Surveying (HDS) equipment; the methodology employed is similar to Close Range Photogrammetry (CRP). CRP is a budding technique or field used for data acquisition in Geomatics. It is a subset of the general photogrammetry; it is often loosely tagged terrestrial photogrammetry. The terrestrial laser scanning technology is a data acquisition system similar to CRP in terms of deigning the positioning of instrument and targets, calibration, ground control point, speed of data acquisition, data processing (interior, relative and absolute orientation) and the accuracy obtainable. The aim of this project was to generate the three-dimensional model of structures in the Faculty of Engineering, University of Lagos using High Definition Surveying, the Leica Scan Station 2 HDS equipment was used along with Cyclone software for data acquisition and processing.

The result was a 3D view (of point clouds) of the structure that was studied, from which features were measured from the model generated and compared with physical measurement on site. The technology of the laser scanner proved to be quite useful and reliable in generating three dimensional models without compromising accuracy and precision. The generation of the 3D models is the replica of reality of the structures with accurate dimensions and location.

Keywords**— Point cloud, Scan station, Laser Scanning, High Density Scanner, Georeferencing.**

I. INTRODUCTION

In any field of study, solutions to problems are developed based on the information acquired about the subject matter. The subject matter may involve tangible or intangible entities but, in engineering, the subject matter is usually tangible, and in this case, it is a physical structure. To obtain any relevant information about a structure, data has to be collected.

"Geomatics engineering is a modern discipline, which integrates acquisition, modeling, analysis, and management of spatially referenced data, i.e. data identified according to their locations. Based on the scientific framework of geodesy, it uses terrestrial, marine, airborne, and satellite-based sensors to acquire spatial and other data. It includes the process of transforming spatially referenced data from different sources into common information systems with well-defined accuracy characteristics." (http://en.wikipedia.org/wiki/Geomatics)

The branches of Geomatics Engineering include Hydrography (hydrogeomatics), Astrophysics, Geophysics, land surveying (Cadastral and Geodetic surveying), remote sensing, cartography, Geographic Information Systems (GIS), photogrammetry etc. During the last decade, the world of engineering surveying has seen enormous developments in the techniques for spatial data acquisition.

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This project attempt to explore one of the recent data acquisition systems which can be termed a fusion of 'remote sensing' techniques and 'close range photogrammetry' (CRP) methods.

Remote sensing is the acquisition of information about an object or phenomenon, without making physical contact with the object. This is possible with the aid of sensors which measure and record some properties (radiation) of the object. Remote sensing could be passive or active; passive when the sensor records natural emissions and reflection from the object and, active when the sensor itself sends a signal to the object and measures the reflected signal over a short space of time. The data acquisition system used in this project operates on the active remote sensing technique. It can also be likened to CRP with respect to the design of the instrument and target positioning, data processing (interior, relative and absolute orientation) and accuracy.

The Leica Scan Station2 High Definition Surveying (HDS) equipment was used along with Cyclone 7.0.3 for data acquisition and processing in this project. High Definition Surveying (HDS) or simply laser scanning is the collection of high-density spatial data sets relating to a structure/objects or land for use in asset and site development planning or dimensional control (http://www.starnetgeomatics.com/laser_scanning.php).

Terrestrial laser scanners acquire data in form of point clouds in 3 dimensions x, y and z, from every scene or station without the need for overlap. It provides the users with the possibilities of direct and automated 3D data capture. TLS employs an indirect ranging principle. The distance, or range from the sensor (a terrestrial laser scanner) to a point on the object surface is determined with high accuracy by measuring the time elapsed between the emission of a laser signal and detection of its portion backscattered from the surface (time-of-flight, TOF). TOF laser scanners employ the following techniques for measuring the travel time of a signal by utilizing different physical effects Wehr and Lohr 1999; Lange 2000).

3D data acquisition about terrestrial objects has been a source of continual research as new technologies keep coming up year after year. The most celebrated methods of simultaneous 3D data acquisition of multiple points and objects are still terrestrial laser scanning and CRP. The data obtained are processed on the computer.

1.1 Statement of the Problem

There is a need to be able to model structure in such way that accurate needed information about positions of features and points can be easily extracted without having to pay physical visits to site. A model that represents an accurate as built survey would effectively solve this problem. The risk involved in some engineering works especially with high rise structure sometimes can be so enormous. Development of models like this therefore becomes imperative in order to reduce risk to as low as reasonably practicable.

1.2 Study Area

The case study, Faculty of Engineering, University of Lagos, Akoka, Lagos, is situated on the main campus; directly opposite Senate car park and Main Auditorium. It was established in the 1964/65academic year with three departments namely Civil, Electrical and Mechanical Engineering.

The Sub Department constituted the core group of hybrid mathematicians and professional engineers who provided academic leadership in various areas of Engineering Analysis.

It was later to become the Department of Systems Engineering. Later in 1973, two other departments, Chemical Engineering and Surveying, were established.

Beginning from the 1982/83 session, the Faculty switched over to the present 5-year programme characterized by the Unit Course System.

The faculty of Engineering has several buildings such as Engineering lecture theatre, New Julius Berger Engineering building, Deans office, Professors, Departmental offices, Laboratories, underground tunnel workshops and classroom blocks. It also boasts of a well laid out walk way and gardens. All of which form our study area (both the inside and outside).

II. LITERATURE REVIEW

2.1 Laser Scanner Overview

Laser scanners are able to conduct rapid and very dense surveys of a structure within an hour (Hirst and Roberts, 2005). The laser scanner can capture and record hundreds and thousands of angles and distances. The distance and angles recorded are transformed in to a dense point cloud of millions of x, y, z points that represent the object being scanned. Laser scanners record up wards of 50,000 points a

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second and the finished point cloud contain many millions of x,y,z points.

The point cloud is displayed in a software package such as Leica's Cyclone or Maptek's Vulcan but for the purpose of the project, the Cyclone 7.0.3 software was used. Many conventional survey software packages have been upgraded to have the ability to view or edit point clouds. The laser scanner works somewhat like an automated total station in that it can be force-centred over a mark and back-sighted to a target. Unlike a total station, where the operator selects all the points for measuring and recording, the laser scanner uses a time of flight measurement or pulsed diode laser for measuring the distance of the transmitted laser and an internal angle recorder to measure the angle that the laser transmitted and the angle the laser receives. The laser scanner has an automated system that programs the scanner to rotate 360° in the horizontal plane and up to 270° in the vertical plane. Different brands of laser scanners have different fields of view (Lichti et al, 1999). The laser that is transmitted hits the surface of the structure being scanned and reflects back to the laser scanner. The laser scanner measures the intensity of the return beam. This intensity is dependent on the reflectivity of the surface. A high reflectivity surface such as a white smooth wall, will give good results while a dark or wet surface will have the low reflectivity. Most laser scanners are able to take a 360 degree panoramic photo of the area being scanned and this photo can provide real colour to the point cloud. This is done by providing coordinates of the digital photo and allows easy interpretation of the point cloud (Bornaz et al, 2004). The spot size of the transmitted laser is an important factor to consider when discussing laser scanning. When a laser is transmitted the laser spot size will increase in size the further the laser has to travel to meet its reflective surface. In the instance of Leica's new HDS6000 the spot size is 8mm at 25 metres and 14mm at 50 metres. Edges of structures will also affect the transmitted laser beam. When only part of the laser beam reflects back off a surface, the other part of the laser will continue until it hits a reflective object and reflects back to the scanner. These edge points will be incorrect. The best way to eliminate this problem is to conduct 2 set ups of the laser scanner from different viewpoints of the edge. This principle is what was applied in the scanning process whereby we created a region of overlap between two scan stations.

2.2 Application of Terrestrial Laser scanning approach to 3D modeling

Due to its fast and accurate ability to scan objects and surfaces, the laser scanner is being utilized in many industries including mining and archeology. The ability of the laser scanner to pick up points without having to have an assistant place a target on the surface or object means that it is perfectly suited to survey dangerous features like busy highways (Chow, 1999) and landslide surveys (Bitelli et al, 2004). Bitelli et al (2004) used laser scanning to monitor a land slip site in Northern Italy, usually this type of work would be done by aerial Photogrammetry methods. The traditional method of airborne surveying was compared to terrestrial laser scanning of the land slip site, which was 40,000 square meters in size. The authors found that the laser scanner provided a fast, accurate and relatively cheap way to monitor mid-size landslide areas compared to airborne survey techniques.

Chow (2004) used a Leica HDS3000 laser scanner to pick up surfaces on high-speed highways in Hong Kong . Using traditional surveying methods, this would have involved the closure of roads and would have been costly. It would have been unlikely to be approved by the road transport authority of the Hong Kong Police. Laser scanning allowed the safe and accurate, non-contact survey of the highway surfaces and features without the closure of roads and the risk to survey personnel. Compared to the traditional method of reflector less measurements to features, and the time taken due to false measurements caused by traffic, the laser scanner produced sub-centimeter accuracy. A ground model was formed and a 1:500 scale topographical map of the area was produced.

Schmid et al (2005), in the logging areas in south West Germany used the laser scanning to monitor soil erosion, a scan of the area was done before and immediately after logging. Another scan was done a year after logging. The model generated for the area showed the effects caused by the logging equipment on the soil. The volume of soil removed was afterwards calculated by analysis of the surface models.

Chow (2007) employed the use of this technology in the capture of survey data in different highway working environments. He highlighted the experience gained in the surveying of ground profile of high-speed roads where traditional survey is greatly difficult to be done without road closure, the steep roadside slope and the headroom clearance

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of high voltage overhanging cables across the expressway. The strengths, limitations, and other possible applications of using the terrestrial laser scanner in highway engineering surveys were also addressed.

Behr et al (1999) used a laser scanner to monitor the deformation of a lock that connected a shipping channel to the North Sea near Amsterdam. The project was aimed at monitoring deformation caused by changes in water level. Two scans of the lock were done from a fixed position. Because the scans were both taken from the same point a point analysis was done. The results showed that there was movement in the lock

Corrado Alvaro1 et al (2009), carried an Architectural analysis and 3D reconstruction of Leopoli –Cencelle in Italy. Laser scanning, GPS and orthophotography data were integrated for the study of the medieval church of Leopoli – Cencelle. Its main purpose was to present a 3d model and the methodological approaches used in the archaeological analysis. The site of Leopoli – Cencelle is in the area of Tarquinia (province of Viterbo), approximately 70 km to the north of Rome.

III. RESEARCH METHOD

Terrestrial laser scanning technique used in this project bears some similarities to some photogrammetric principles. The similarities include registration of scan to scan, which can be likened to relative orientation; Georeferencing by registration, which is also similar to absolute orientation.

The instruments used in this project are classified into hardware and software. The different hardware used are; from control survey was done by GPS, target coordination by total station e.t.c. Leica Promark 3 (dual antenna) GPS and accessories, Leica TS06 total station and accessories, Leica Scan Station 2 HDS and accessories. Various software products were used for data acquisition, data processing, visualization, analyses and interpretation which include Cyclone 7.0.3, Leica Geo-Office, Microsoft Access 2007 and Microsoft Excel 2007.

A Reconnaissance survey of the area of study was carried out, the design stage was done in the office, drawing from the experience of the field reconnaissance survey and the data acquired from the office reconnaissance survey. Identified spots from the field were marked on the architectural plan and a network was created of points were created. Every prospective station was designed to accommodate four target points in four different directions, so as to have good alignments for scan world to scan world registration (relative orientation).

The instrument stations were marked on the ground by a 'point edge nail' embedded in a triangular mark on the ground each station was also given specific names or code. The first station occupied was named "station1", and its corresponding targets were coded as 'tgt1', 'tgt2', 'tgt3'and 'tgt4'.

Fig.3.1: Station marking for one of the stations

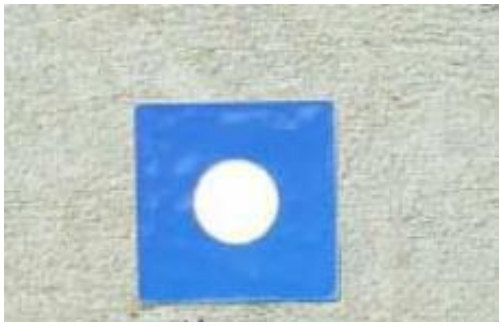

Fig.3.2: Target and target description

The survey can be classified into three different classes namely; Laser scanning, Control survey, Specific point survey. The laser scanning was done using the Leica Scan Station 2 (HDS 3000). The Leica Scan Station 2 is also used in a step by step approach. Set up, configuration, settings, probing, 3D image acquisition, target acquisition, point cloud acquisition.

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Fig.3.3: Showing the set up of the instrument, after connecting the cable

The scanner was configured by adding a new scanner on the window. It was named Unilag and the IP address (10.1.204.55) on the instrument was entered.

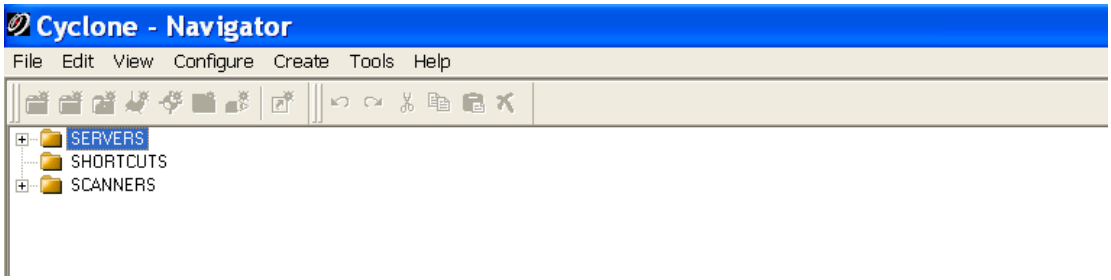

Fig.3.4: Showing the default look of the cyclone 7.0.3 environment

Other configurations that were done were for the 'server' and the 'database' used for the project. The server was added as 'USER (Unshared)' and the database was named '3D modelling'.

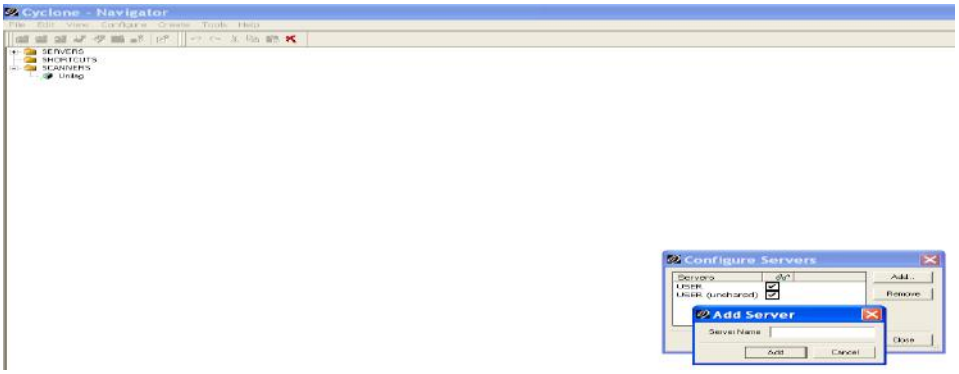

Fig.3.5: Showing configuration stage for server after configuring the scanner

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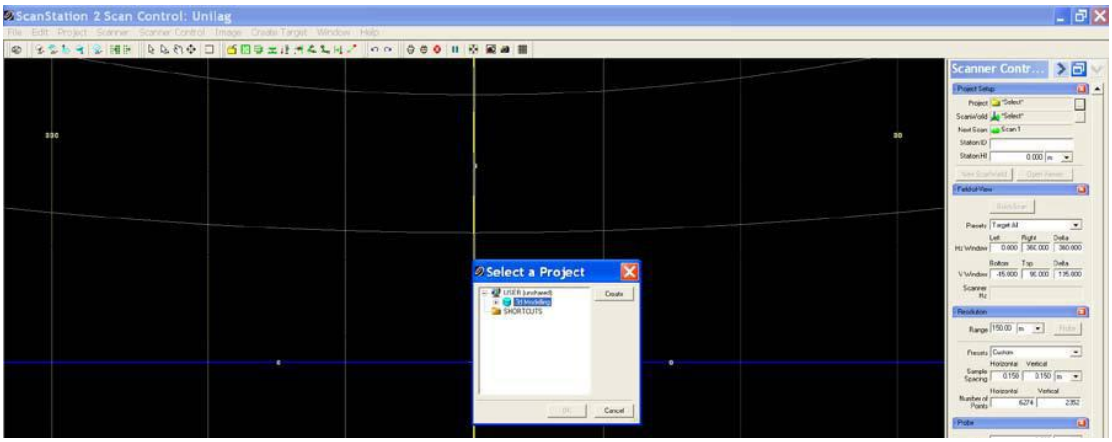

Fig.3.6: Creation of a project into the configured database via the scan control window

Once created, the workspace automatically opened up with a scanworld name which was edited and saved as ‘station1

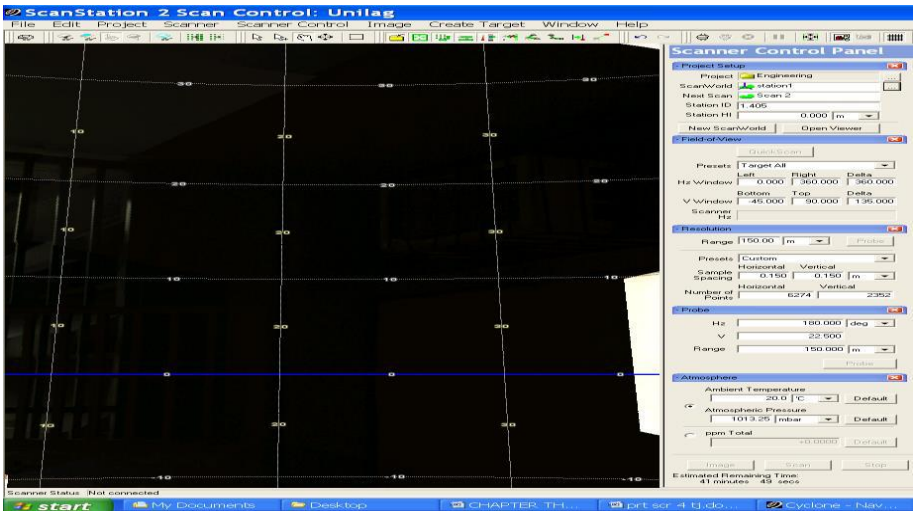

Fig.3.7: Showing the scan control window

For every station occupied, the 3D image was taken, spanning the field of view, it was done by clicking ‘get image’ on the image menu from the scan control window. This enabled us to see the features around the structure, especially the targets and where they fell in the scan control window. Knowing where the targets are on the scan control window makes it easier for anyone to acquire the scan for the targets.

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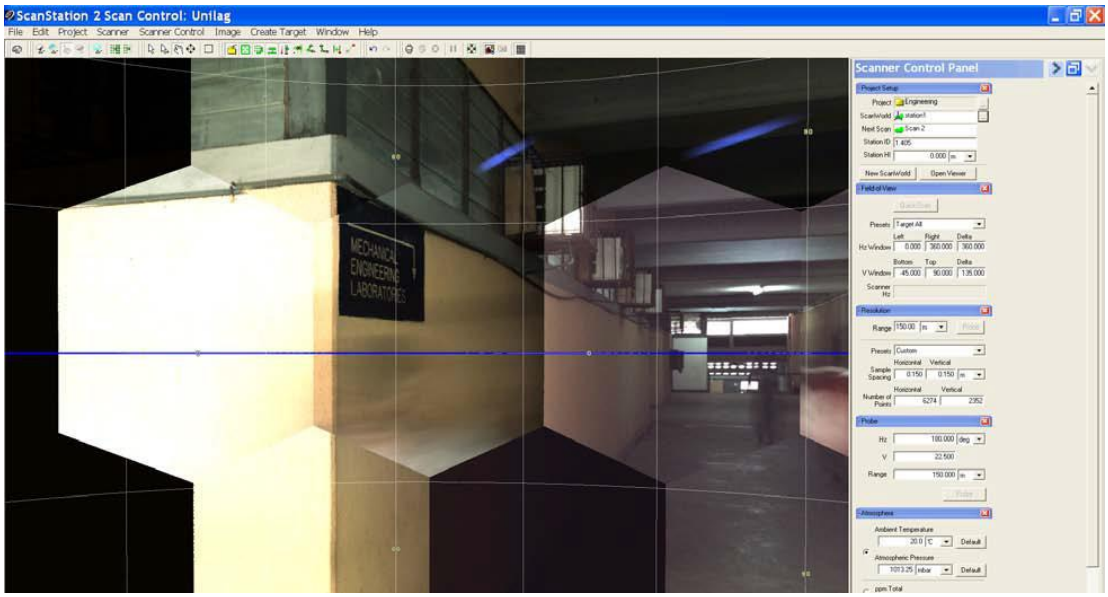

Fig.3.8: Acquiring the 3D image (from the scan control window).

Targets were acquired by first defining a fence around where they were shown in the image acquired. The fence was to define a smaller field of view for the scanner to search for them, it made target acquisition easier and faster. After defining the fence, the targets were acquired using the scanner control menu and clicking on 'Acquire targets'. As it was with the instrument itself, the target height was noted and imputed in the target listing, with each target given its own target ID.

Fig.3.9: Acquired targets from the 3d picture taken from another station

To acquire the point clouds, the scan button on the scan control window or navigating through the scan control menu on the menu bar. We used either as soothing to the person acquiring the scan at that specific station.

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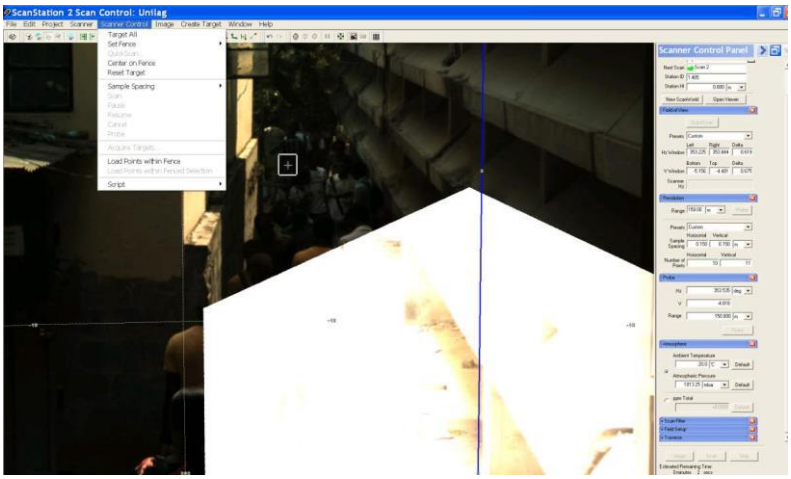

Fig.3.10: Process of initiating the scan

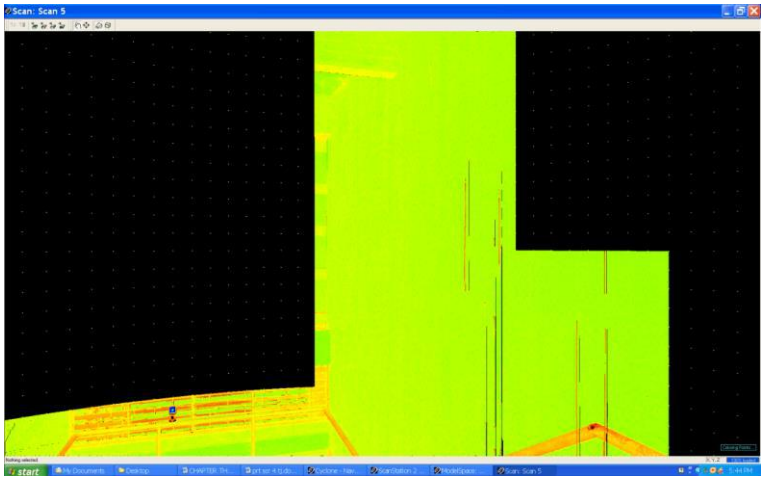

Fig.3.11: Point clouds loading during scanning

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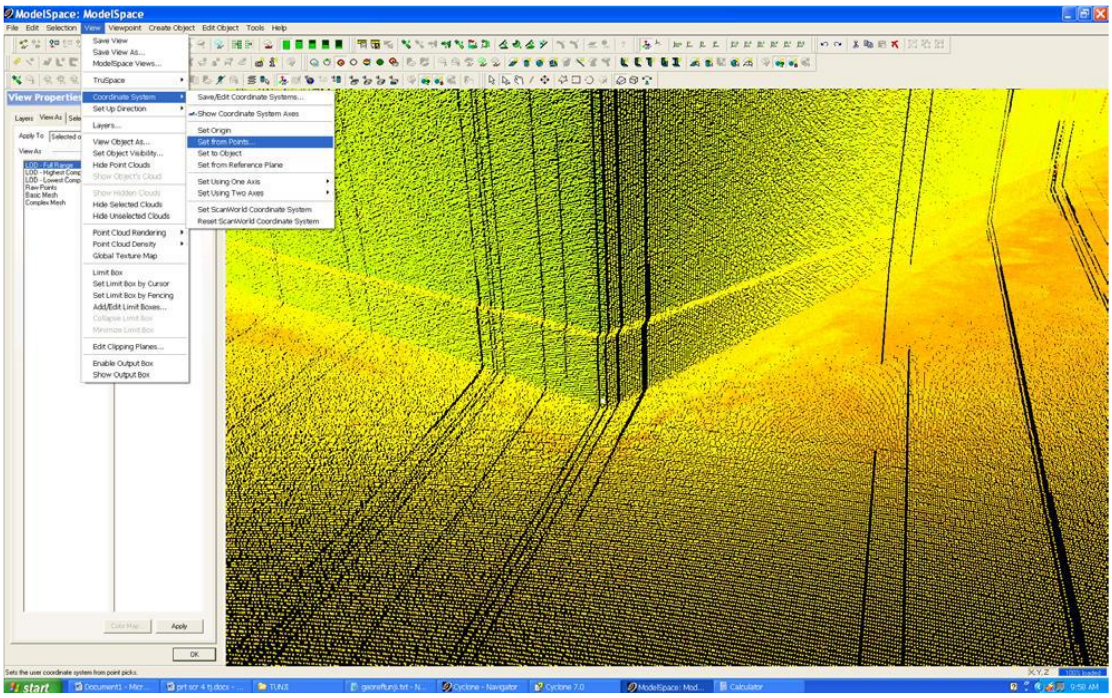

Fig.3.12: Accessing the coordinate system of the current scanworld for the transformation.

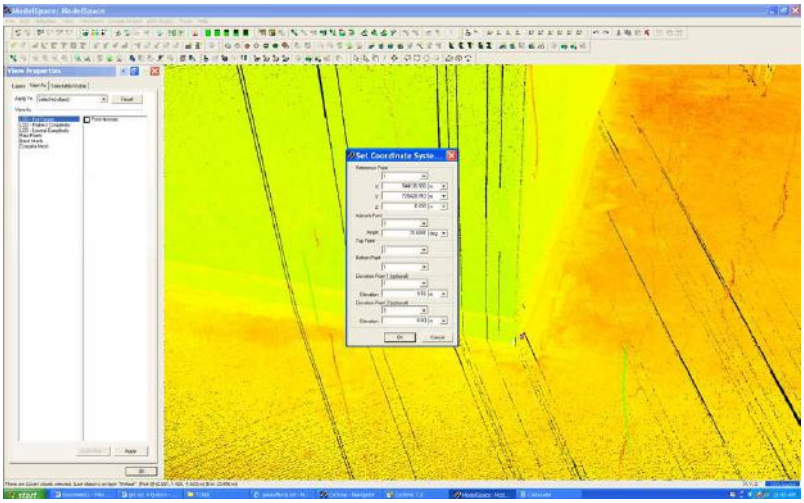

Fig.3.13: Fixing the required parameters for the three points in chosen.

Modeling in the cyclone environment is also refered to as 'meshing'. The meshing tool that defines the solid/model that we desire is called complex meshing. However, the complex meshing tool became inactive when all the point clouds were selected. As such all the point clouds in ScanWorld [Surveying and Geo Office] could not be used to make the model. Alternatively, point clouds were selected generally across the scanworld and the space was viewed as a complex mesh

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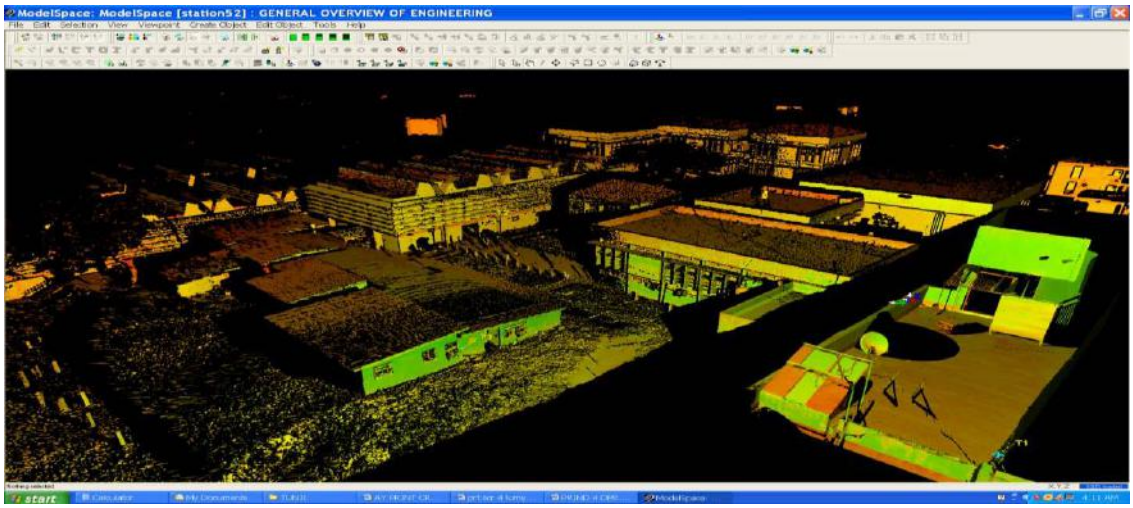

Fig.3.14: The Mesh Aerial View of the faculty of engineering from energy and conservation centre

A 'fly through' was done on the modelled structure by panning and zooming through in point cloud or model viewing mode. The animation was done by creating a layer for animation, inserting cameras, connecting cameras with paths, editing animation parameters and saving the animated view as a video file.

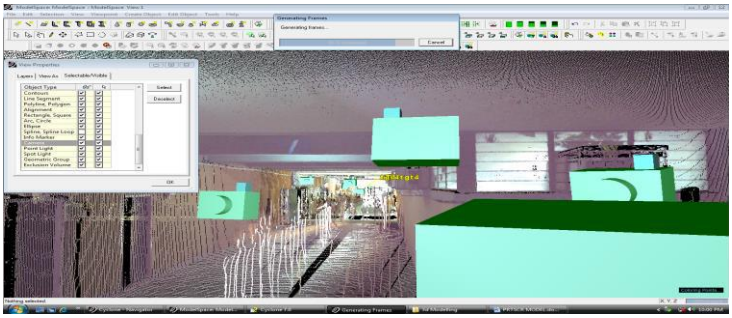

Fig.3.15: Camera position and positioning during animation building

IV. FINDINGS AND DISCUSSION OF RESULTS

From the control and target surveys, coordinates were obtained for about one hundred points in and around the survey area. However only the coordinates relating to Station 1 and Station 2 are shown.

Table 4.1. Showing the coordinates established from the GPS control survey.

Easting	Northing	Elevation	Point Id	Remark
544197.299	720454.173	6.779	L001	Control
544231.361	720437.129	7	L002	Control

Contiguous and overlapping scan worlds were registered together to form a single and seamless scanworld. The coordinate system of individual ScanWorlds are transformed into a common coordinate system; this is similar to 'relative orientation' in photogrammetry.

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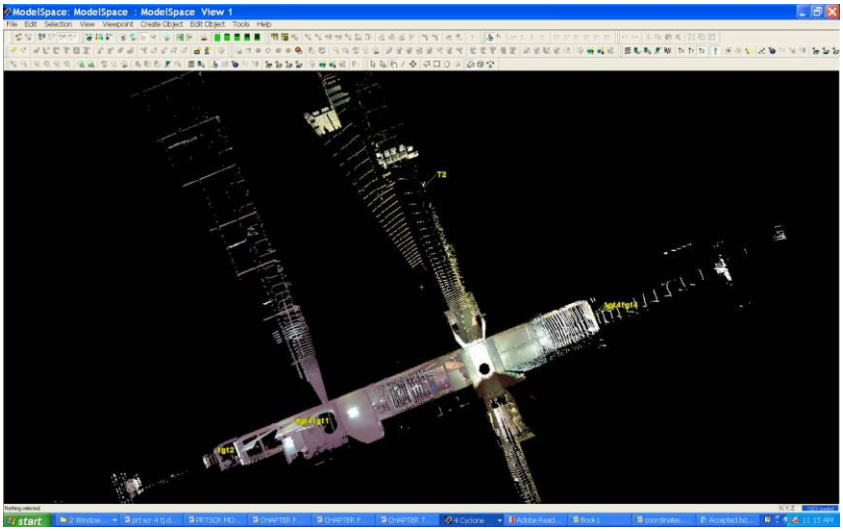

Fig.4.1: Two stations from a single scan world, showing the registered scan worlds.

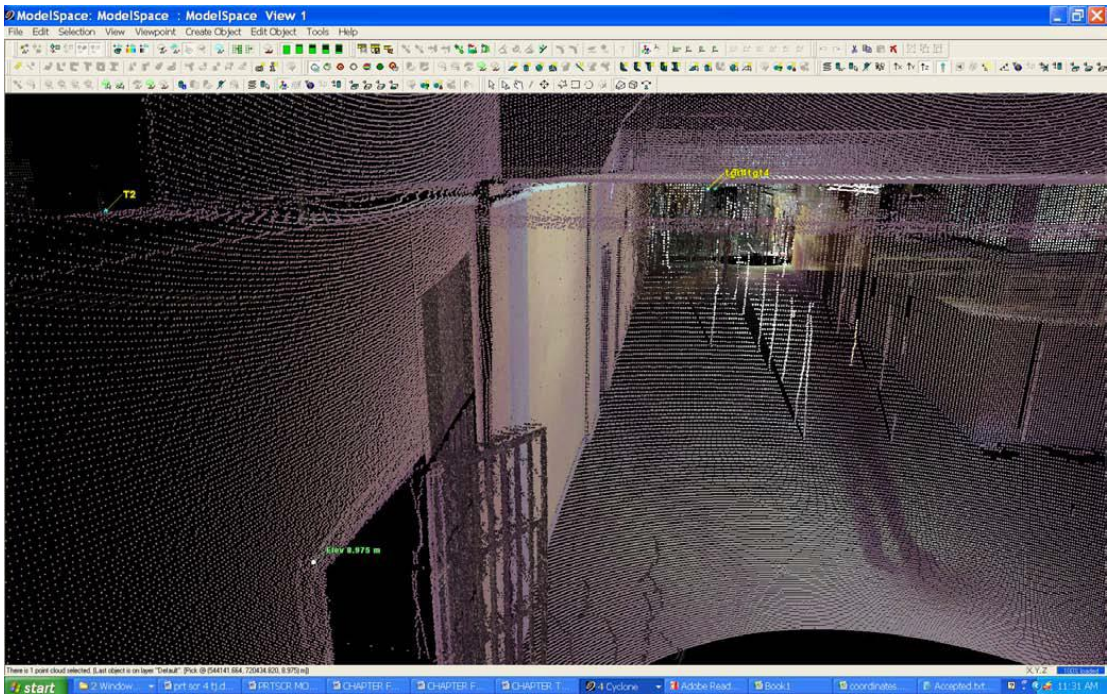

Fig.4.2: Registered scanworld in real life coordinates.

4.1 ANALYSES

The registration process from scanworld to scanworld can actually be done in various ways. These are Target constraint alone, Cloud constraint alone or hybrid method. Cloud constraint alone was adopted for this project.

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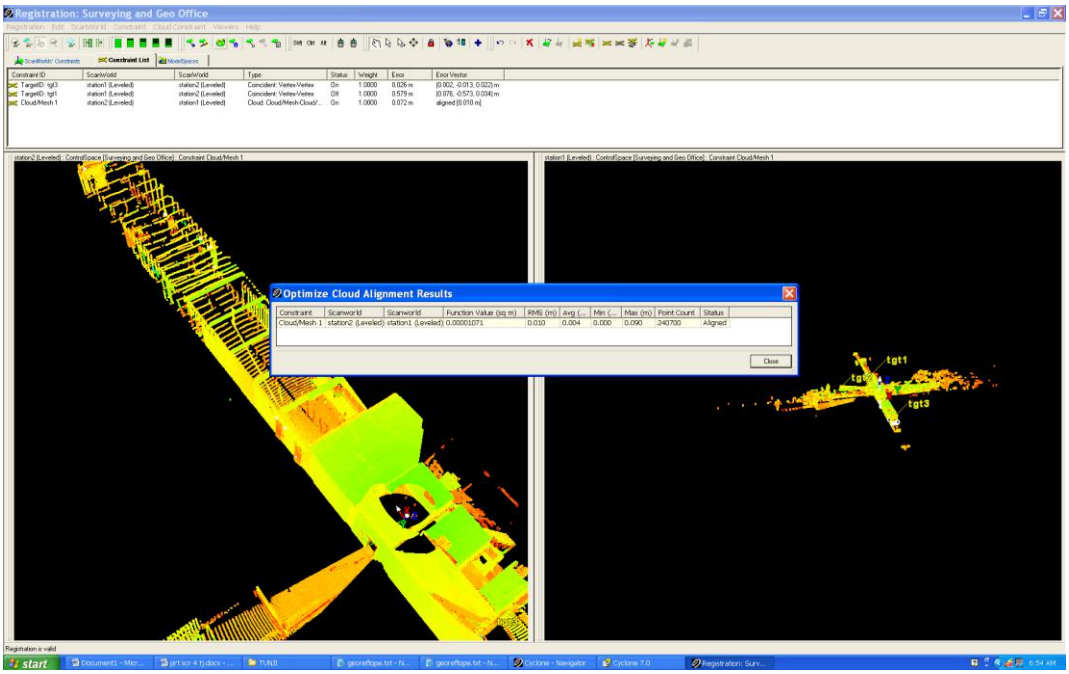

Fig.4.3: Cloud optimization result.

During the coordinate transformation stage, only three points were used to re-orient the scanworld into real life coordinate system (absolute orientation). The points used were tagged Georef_8, Georef_7 and Georef_12 as points 1, 2 and 3 respectively. However, other points were also bisected with the total station on the field. All the points that were acquired on the field using the total station were also converted and imported into cyclone as targets.

Checking was done in two ways. Firstly, points of known coordinates on the structure were picked in the scanworld, and the coordinates obtained from cyclone was checked against the corresponding downloaded sets of coordinates from the total station.

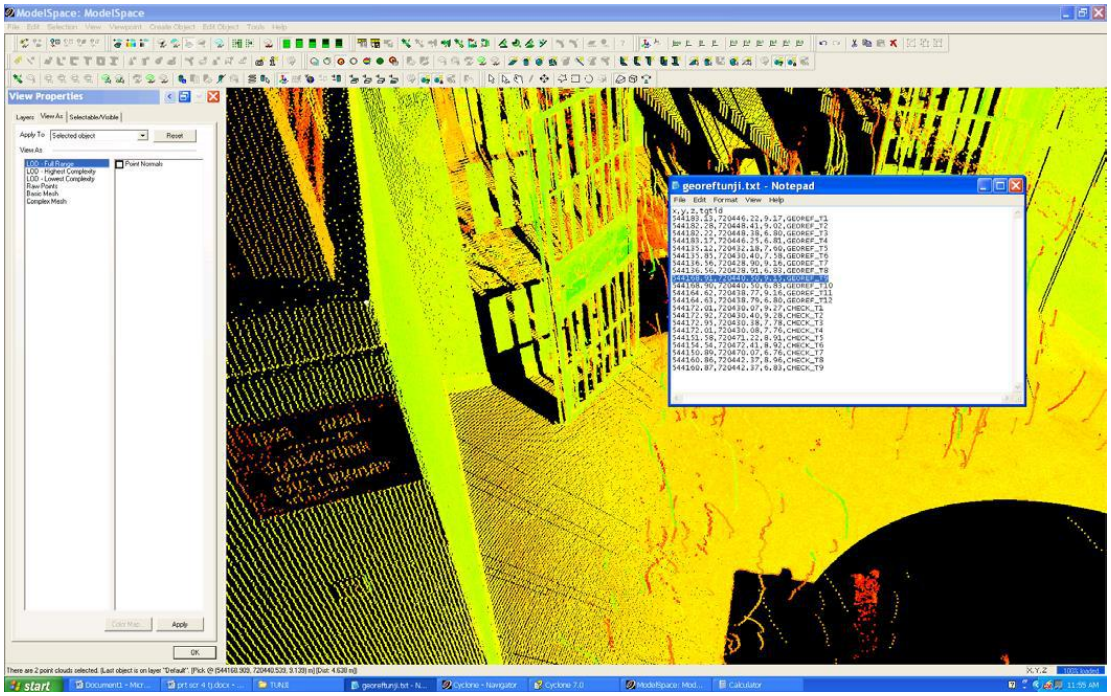

Fig.4.4: Picked point on the scan against the corresponding coordinated point on ground

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From Figure 4.4 above, the picked point on the scan is having coordinates showing on the lower left corner of the window and the total station coordinate is also shown as an overlay. The table below shows the comparative coordinates for point ID GEOREF_T9.

Table 4.2: Comparative coordinates for point ID GEOREF_T9.

Point Cloud Easting (m)	Total Station Easting (m)	Difference in Easting (m)	Point Cloud Northings (m)	Total Station Northings (m)	Difference in Northings (m)	Point Cloud Height (m)	Total Station Reduced Level (m)	Difference in Height (m)
544168.909	544168.91	0.001	720440.539	720440.50	0.039	9.139	9.15	0.011

The imported 'targets' (i.e. field coordinates) was overlaid on the point clouds in the scan; from which approximate description or label was given to specific point clouds. Some measurements were taken with the linen tape and checked with the ones obtained in the scanworld. Two of such points are tabulated below;

Table 4.3: Measurement comparison

Scanworld Measurement	Tape measurement	Station description
4.816m	4.82m	Width of corridor
0.960m	0.98m	Width of entrance to Departmental office

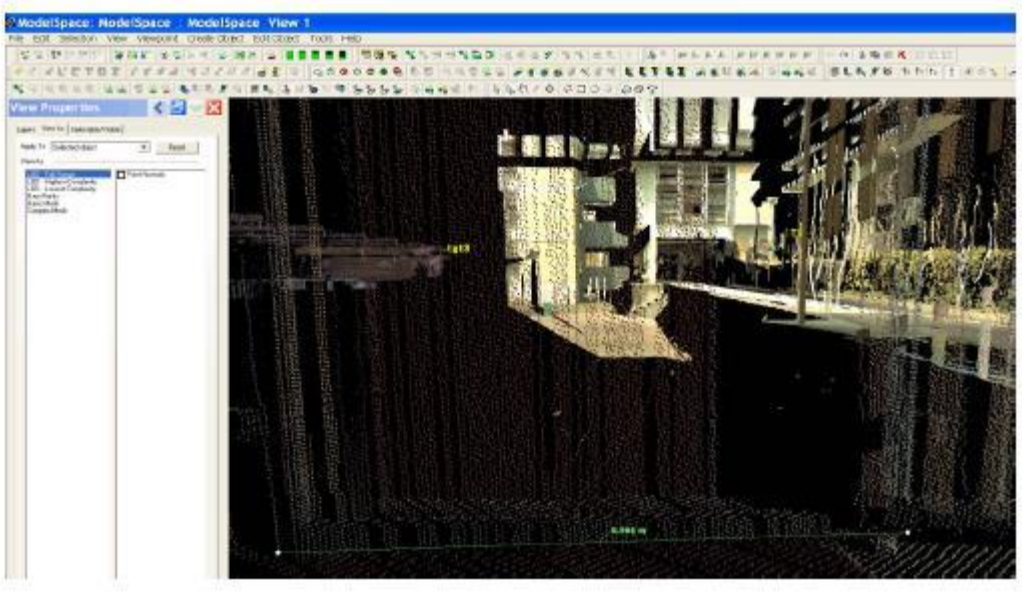

Fig.4.5: Showing the measured distance in the scanworld

Other measurements were taken from the point clouds to query distances and heights. As shown in the figure below;

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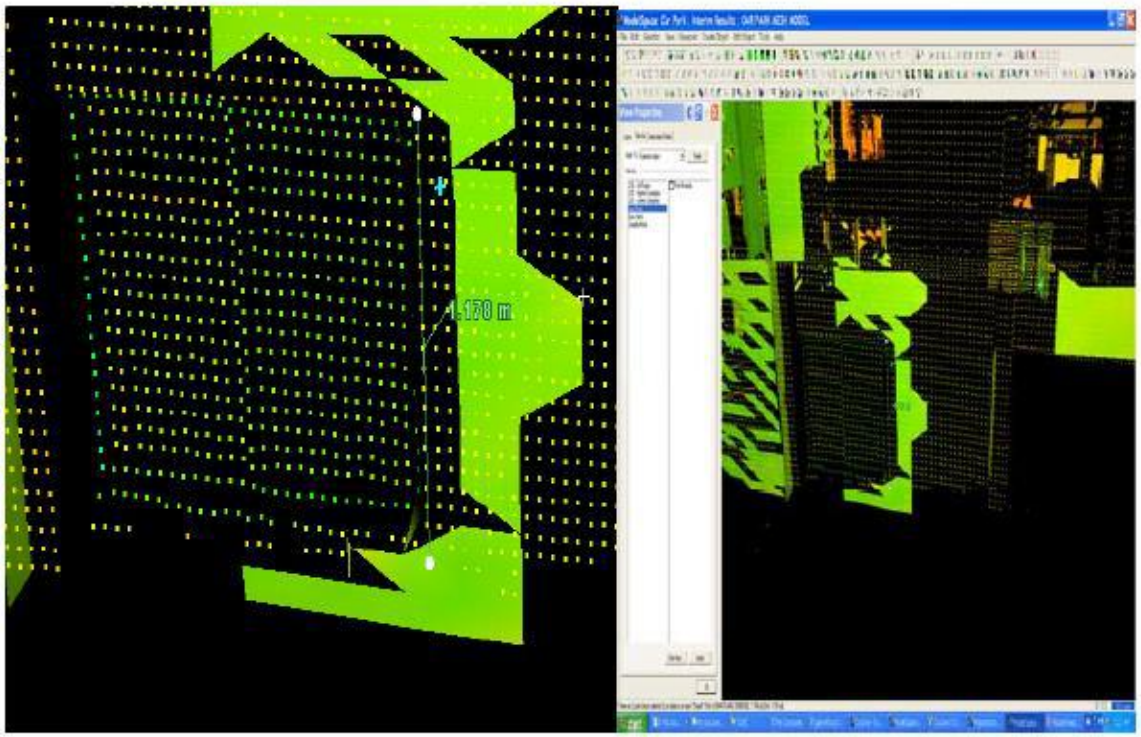

Fig.4.6: Image showing measurement of sign post taken

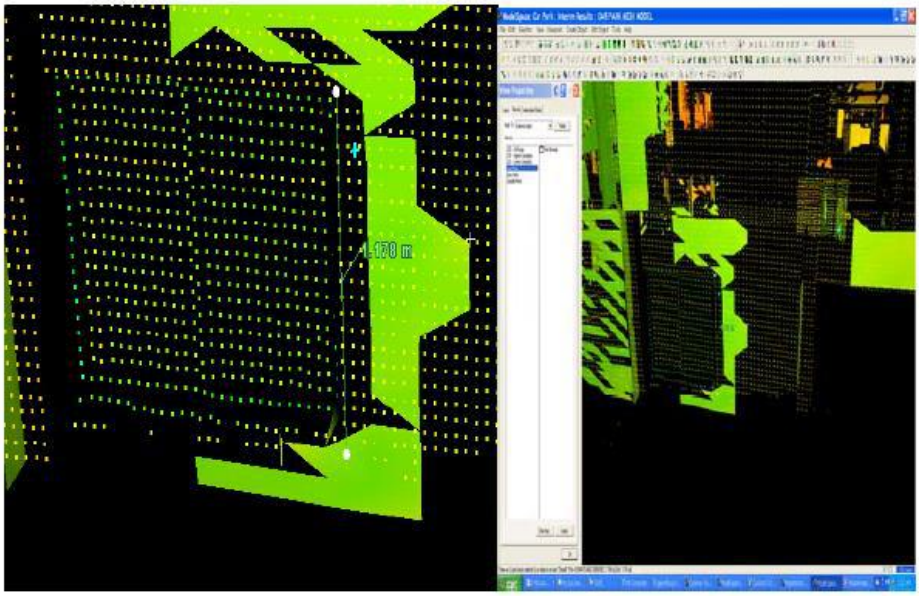

Fig.4.7: Image showing measurement of window side

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Table 4.4. Showing observed and extracted length of check features

Scan station Measurement	Tape measurement	Site description
0.219m	0.217m	Breadth of sign post
1.178m	1.165m	Length of porters window

From observed data the error for the features can be calculated as;

ΔL = L1-L2 where L1, L2 are measured length values. Therefore,

0.219 - 0.217= 0.002 (Sign Post)

1.178 - 1.165=0.011 (Porter's Window)

Average of errors :(0.002+0.0011) / 2= 0.0065m

Net error is about 0.006m. This error may have been due to the scan interval specified.

V. CONCLUSION

It is safe to conclude that the project met its set out objectives. The generation of a three-dimensional model of the Engineering faculty using HDS was actually achieved and an added task of a walk-through simulation was added. The technology of the laser scanner was proven to be quite useful and reliable in generating three dimensional models without compromising accuracy and precision.

The generation of its three dimensions is reality based which makes the model generated, look as close as possible to physical realities. It was possible to make direct measurement to features to millimeter accuracy if desired from these models. The shapes and geometries of observed features were observed not be altered significantly except in places where obstructions existed. However, these obstructions are removable using noise clean ups. The laser technology provided the advantage of night observation- a feature not available to many other approaches. Quite a number of our scans were acquired at night. Some of the finest models generated were from scans acquired at night.

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Modes of Payment and Challenges Encountered by Real Property Taxpayers: An Evaluation

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Abstract*— *This study aimed to determine the services received by the taxpayers on real property revenue in Talavera, Nueva Ecija, Philippines. It utilized a descriptive method of research and focused on the modes of payment utilized by 127 respondents and the challenges they've encountered in paying their taxes. Results of the study show that majority of the taxpayers were females in the age bracket of 41-50 years old, married, Roman Catholics, college degree holders working in the local government units with a monthly income between P10,000.00 to P19,999.00 ($200 to less than $400) and are good taxpayers. Their modes of payment were through technological devices such as cellular phones. The high amount of real tax revenue, penalties, excessive collections, and increasing taxes were the most common challenges encountered by the taxpayers. They are in favor of paying the taxes semi-annually. Based on the conclusions of the study the following recommendations were offered: Continuing awareness and education about the income tax returns collections in the whole town must be prioritized and the participation and collaborations of the church and local government in revenue collections as social and moral obligations of responsible Filipino citizen must be strengthened.

Keywords*— *Awareness, evaluation, mode of payment, real property taxpayers, revenue.

I. INTRODUCTION

Tax compliance by every taxpayer in real property provides efficient tax collection for every country in the world. That is why the owner of the property needs to comply and pay their annual obligations. The real property tax for any year in the Philippines shall occur on the first day of January [1].

On the basis of the taxing authority of the local government unit, according to section 129 of the R.A 7160, each local government unit shall exercise its power to create its own sources of revenue and to levy taxes, fees, and charges subject to the provisions herein, consistent with the basic policy of local autonomy. Such taxes, fees, and charges shall accrue exclusively to the local government units [2].

According to Gomez [3], devolution of functions transfers assets, records, regional offices, and personnel to the Local Government Units (LGUs), and subsequent to the devolution of functions, local governments were allotted an automatic share of national tax revenues. To encourage self-reliance, the Local Government Code (LGC) defines the revenue-raising prerogatives of LGUs. Provinces, municipalities, cities, and barangays are granted the power to levy taxes with specified maximum rates as well as to impose fees and charges for various services. Thus, Local Government Units are empowered to create their own sources of revenues and to levy taxes, fees, and charges, one of which is real property tax. Section 233 of the Local Government Code of 1991, states that the following rates of basic real property tax are prescribed based on assessed values of real properties in the Philippines, 1% for the province and 2% for city or municipality within Metro Manila area [4]. Aside from the basic real property tax, the following may likewise be imposed under real property taxation in the Philippines, special education fund (SEF) of 1% of the assessed value of a real property, ad valorem tax on idle lands of 5% of the assessed value of real property tax, special assessment to recover at least 60% of public improvement benefiting the real property [5]. The Local Assessor shall take charge of the discovery, classification, appraisal, assessment, and valuation of all real properties within his territorial jurisdiction which shall be used as the basis for taxation [6].

The real property tax is the most important tax revenue of local governments. In the eighties, it accounted for 23 percent of the total revenues of local governments [7]. Its

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relative importance started to decline in 1990 to 18 percent and dropped in 1994 to 11.0 percent. Thereafter, it picked up strength and now accounts for 13.36 percent of the total revenues of LGUs [7].

According to the Talavera Municipal Treasurers Office [8], real property tax is nineteen percent (19%) of the total revenue income of the Municipality of Talavera in the year 2019 which plays a vital role in the development of infrastructure for local use, industrial research and support services, tourism promotion programs and investment support services, primary health care and the management and maintenance of the ecological balance for sustainable progress of Talavera as a first-class municipality in Nueva Ecija despite the large percentage of collectibles and delinquency of the real property taxpayers [8].

The government received complaints among the taxpayers concerning the property tax collection system. Awareness of tax compliance needs to be encouraged continuously in order to reach targeted tax revenue [9]. Property owners that encountered various problems in the implementation of real property revenue have solutions and remedies to survive. For these strong reasons, this study was conducted. It aimed to describe the socio-demographic profile of the respondents, modes of payment, experiences in paying real property tax, and the challenges they have encountered and suggestions of the respondents to address the challenges.

II. METHODOLOGY

The researchers utilized the descriptive method of research in determining the services, experiences, and challenges encountered by the taxpayers on real property revenue in Talavera, Nueva Ecija, Philippines. According to the author in [10] as cited in [11], "descriptive research is a fact-finding study with adequate and accurate interpretation of data and describes with emphasis what actually exists such as the current condition of the phenomenon". The 127 purposively chosen respondents [12] described their experiences in paying their real property tax in a questionnaire-checklist self-made research instrument. Data were collected from May 2020 to June 2020. The data gathered from the respondents were analyzed using appropriate statistical tools such as frequency, percentage, and weighted mean.

III. RESULTS AND DISCUSSION

1. Socio-Demographic Profile of the Respondents

Respondents within the age bracket of 41-50 years old got the highest frequency count of 34 or 27% while ages 71-80 years old got the lowest frequency count of four (4) or 3%. As to civil status, out of 127 respondents, 112 or 88.19% were married, two (2) or 1.57% were widowed and 13 or 10.24% were single. In terms of sex, 68 or 53.54% were males and 59 or 46.46% were females. For the respondents' religion, 104 or 81.89% were Roman Catholics and represents the highest frequency count while Jehovah's Witnesses got the lowest frequency count of three (3) or 2.36%. In their occupation, 43 were working in the local government units occupying the highest frequency count while sewers got the lowest frequency count at three (3) or 2.26%. For their educational attainment, 68 or 53.54% were college graduates while the Master's degree holders got the lowest frequency count of two (2) or 1.57%. In terms of their monthly income, 53 or 41.73% were earning 10,000 to 19,999 ($200 to less than $400).

2. Modes of Payment Regarding Real Property Tax Payment

Devices as a mode of respondents' compliance in paying their Real Property Tax got the highest frequency count of fifty-nine (59) or 46.46% while advertisements got the lowest frequency count of 4 or 3.15%. Advertisements of the real property tax office should be heightened to enhance the interests [13] of their taxpayers.

3. Challenges encountered in Paying Real Property Tax

This study revealed that the main challenges encountered [14] by the respondents are Item 4 which is "Highly amount of the real tax revenue" with the weighted mean of 2.69. Moreover, moderately serious problems such as penalties, excessive collections, and increasing taxes were also part of the most common challenges encountered by the taxpayers.

4. Respondents' Suggestions regarding Better Tax Payment

"Paying the taxes semi-annually" got the highest frequency count of forty-nine (49) or 38.58% while "Paying through amnesty" got the lowest frequency count of nine (9) or 7.09%. Likewise, statements such as "Paying on time" and "Paying in advance" were also suggested by the respondents to improve the tax collection systems of the office.

IV. CONCLUSIONS AND RECOMMENDATIONS

Majority of the taxpayers in Talavera, Nueva Ecija, Philippines, were females in the age bracket of 41-50 years,

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married, Roman Catholics, college degree holders working in the local government units with a monthly income between P10,000.00 to P19,999.00 ($200 to less than $400); the majority of the respondents are good taxpayers and reminders through devices such as cellular phones have a big role in reminding the taxpayers regarding their obligations in paying taxes; the process of updating taxes, time and mode of payments and length of processing time were the most common experiences encountered by the taxpayers. In addition, the procedures in tax-paying have a moderate impact in the collections of payments that needs to be addressed by the Bureau of Internal Revenue units; the high amount of the real tax revenue, penalties, excessive collections, and increasing taxes were the most common problems encountered by the taxpayers; the respondents are in favor of paying the taxes semi-annually followed by paying the taxes annually. Thus paying taxes semi-annually is much better for those respondents in rural areas like Talavera, Nueva Ecija. Paying on time is the most effective way to come up with the best real tax property payment followed by paying in advance. Likewise, there should also a continuing awareness and education about the income tax returns collections and participation and collaborations of the church and local government in revenue collections as social and moral obligations of responsible Filipino citizens must be strengthened. Additionally, the Bureau of Internal Revenue offices through their officers must utilize and prepare more attractive media and local advertisements to encourage all citizens in paying their taxes regularly. Lastly, proper preservation of documents and records keeping by utilizing a computerized management information system (MIS) must be employed to avoid missing records of the taxpayers. Also, there should also be a system that has a built-in feature that ensures a safe internet [15] taxpayers collection.

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Perception, Awareness, Acceptance and understanding of NEUST-sic Community towards its Vision, Mission, Goals and Objectives

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Abstract— *This study focused in determining the Perception, Awareness, Acceptance and Understanding of Nueva Ecija University of Science and Technology San Isidro Campus Community towards the its Vision, Mission, Goals and Objectives of programs offered (VMGO). The survey instrument used in this study was a modified survey questionnaire from previous studies conducted by Castillo (2016). The items regarding the perception, awareness, acceptance and understanding on VMGO included in the survey instrument were based on the 2010 AACCUP Revised Instruments. The respondents of the survey were the NEUST-SIC (1325) internal stakeholders and (565) external stakeholders respectively. Findings show that External Stakeholders generally were least aware, least accept and understand the Vision, Mission, Golas and Objectives of NEUST. It is also revealed that the external stakeholders believed that the vision, mission, goals and objectives are not clearly stated and consistent with each other. However, they all agreed that the program objectives are clearly stated in terms of aesthetic and cultural values. Thus, it is recommended that widest dissemination of the VMGO through various forms of communication media, conduct campaigns or other related activities should be done by the NEUST-SIC community to further raise awareness among external stakeholders and thereby strengthen support.*

Keywords— ***Vision, Mission, Goals and Objectives, Perception, Awareness, Acceptance and Understanding.***

I. INTRODUCTION

The Heart of an institution consists of its vision, mission, goals and objectives (VMGO). A Vision is inspirational statement about what the organization wants to become and achieve in a long-term future. It describes the overall character and gives direction of its existence. Through the university's and colleges' vision, the staff and the students together with their pillars are inspired and well-motivated on their responsibilities and important roles in the success of their institution and how it will provide great impact to their stakeholders and the whole community. Vision, mission and goals is vital for any organization since it will direct the path of the organization in achieving its long and short term objectives [8].

A Mission statement defines what an organization is, why it exists and its reason for being [4]. Through an institution's mission, its clientele has a clear understanding and knowledge on the quality of services that a university or college offers.The vision and mission are statement on the long-term view of the institution of itself and the world within which it operates its long term role and stature, and what it does to achieve this purpose and how it would like to play its role. the need to articulate the comprehensibility of the Vision, Mission, Goals and Objectives of a university is indispensable as these are the schemes, designs, outlines and frameworks for which action plans are based. Similarly, the comprehensibility of the goals of a college is deemed equally important to investigate in order to determine its strengths and weaknesses which will guide the leaders in implementing such innovations

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[12]. The program objectives are broad statement that describe the career and professional accomplishment that the program is preparing graduates to achieve within a prescribe number of years of graduation. These objectives are based on the needs of the program constituencies. With this in mind, collaboration among school leaders or administrators is vital in the achievement of the mission and goals of the institution [6].

Accrediting Agency for Chartered Colleges and Universities in the Philippines (AACCUP) possessed certain standard of quality excellence based on the institutional operations in relations to VMGO. A university is judged by the degree to which its VMGO are attained and not in comparison with others [1].

The effectiveness of the VMGO lies in its structure and dissemination. The students, staff as well as the community must have a full understanding and awareness of the VMGO as a measure of its proper dissemination [5].

Nueva Ecija University of Science and Technology, San Isidro Campus is guided by its new vision, mission, goals and objectives as its continue to achieve academic excellence and produce quality graduates. Its vision is "NEUST is a locally responsive and internationally relevant and recognized University of Science and Technology. Its mission is "to develop new knowledge and technologies and transform human resources into productive citizenry to bring about development impact to local and international communities [3].

Since NEUST's VMGO has become concise and comprehensive, the researchers deemed it wise to conduct a study regarding the awareness, perception and acceptance of the NEUST San Isidro stakeholders.

Specifically, this research sought to:

1. Determine the awareness of the internal stakeholders and external stakeholders with regard to the Vision and Mission of NEUST-SIC, the Goals and Objectives of the curricular programs offered (VMGO).

2. Determine the awareness of the internal stakeholders and external stakeholders with regard to the dissemination of the Vision and Mission of NEUST-SIC, the Goals and Objectives of the curricular programs offered (VMGO).

3. Analyse the understanding and acceptance of internal stakeholders and external stakeholders with regard to the Vision and Mission of NEUST-SIC, the Goals and Objectives of the curricular programs offered (VMGO).

4. Assess the perceptions of the internal stakeholders and external stakeholders with regard to the clarity and consistency of the Vision and Mission of NEUST-SIC, the Goals and Objectives of the curricular programs offered (VMGO).

5. Assess the perceptions of the internal stakeholders and external stakeholders with regard to the congruency to activities, practices, and operations; and attainability of the Vision and Mission of NEUST-SIC, the Goals and Objectives of the curricular programs offered (VMGO).

II. METHODOLOGY

This study employed the use of quantitative descriptive type of research design. Quantitative methods emphasize objective measurements and statistical, mathematical, or numerical analysis of data collected through polls, questionnaires and surveys, or by manipulating pre-existing statistical data using computational techniques [9]. The survey instrument used in this study was a modified survey questionnaire from previous studies conducted by Castillo (2016). The items regarding the awareness, acceptance and perceptions on VMGO included in the survey instrument were based on the 2010 AACCUP Revised Instruments.

The respondents of the survey were the NEUST-SIC internal stakeholders and external stakeholders were broken down as follows: Administrators or faculty members, non-teaching staff, students for internal stakeholders while the parents/guardians Parents – ambassadors for providing constructive suggestions for the smooth functioning of an institution [11], alumni and industries, linkages or cooperating agencies for external stakeholders.

A non-random convenience sampling was utilized, that is respondents are chosen as to who were readily available.

The Distribution and retrieval of survey instruments from internal and external stakeholders was done by the researchers themselves with an assistance from the students, teachers, alumni and parents related to industries and linkages.

Statistical Mean was used to determine, analyse, and assess the awareness, perception, and acceptance and understanding of the Vision and Mission of NEUST-SIC, the Goals and Objectives of the curricular programs offered.

The following scale and interpretation were used to better understand the quantitative data.

Response Mean	**Awareness Acceptance/ Perception Understanding**

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4	3.50 to 4.00	Highly Aware	Greatly Accept Strongly Agree	2	1.50 to 2.49	Least Aware	Slightly Accept Disagree
3	2.50 to 3.49	Aware	Accept Agree	1	1.00 to 1.49	Not Aware	Not Accept Strongly Agree

III. RESULTS AND DISCUSSIONS

Table 1. Number of Respondents per Category

Category	Frequency	Percent
INTERNAL STAKEHOLDERS		
*Administrator/Faculty	34	
*Non-teaching Staff	11	
*Student	1280	70.1
Total	1325	
EXTERNAL STAKEHOLDERS		
*Parent/Guardian	341	
*Alumni	118	
*Industry/Linkage/Cooperating Industry	106	29.9
Total	565	
Total	1890	100.00

Table 1 shows the number of respondents per category. The researcher believed that the 1,890 respondents truly represent the majority of the population. It was targeted that at least 30% of the respondents are external stakeholders and 70% are internal stakeholders.

Table 2. Awareness on the VMGO of Internal Stakeholders

Statement	**Mean**			**Weighted Mean**	**Verbal Interpretation**
	Faculty/Administrators (n=34)	Non-teaching Staff (n=11)	Student (n=1280)		
I am aware of the Vision of NEUST	3.94	3.82	3.49	3.50	Highly Aware
I am aware of the Mission of NEUST	3.88	3.82	3.49	3.50	Highly Aware
I am aware of the Goals and Objectives of the programs offered.	3.88	3.73	3.46	3.47	Aware
Overall	3.9	3.79	3.48	3.49	Aware

The data shows that the Administrations and Faculty Members as well as the non-teaching staffs are “Highly Aware” while students are “Aware” of the Vision and Mission of NEUST-SIC and to the Goals and Objectives of the curricular programs offered.

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In general, the NEUST internal stakeholders are "Aware" with the highest mean on the Vision and Mission of NEUST-SIC, while the lowest mean on the goals and objectives of the program offered. The school vision, mission, and goals are a very important part of curriculum development. It serves as the guiding post around which all educational efforts, including in the curriculum should be aligned [10]. Therefore, it is understandable that the internal stakeholders such as the administrations and the faculty members must be highly aware if the VMGO of the educational institution.

Table 3. Awareness of External Stakeholders on the VMGO

Statement	Mean			Weighted Mean	Verbal Interpretation
	Parents (n=341)	Alumni (n=118)	Industry/ Linkages (n=106)		
I am aware of the Vision of NEUST	2.35	3.31	1.49	2.38	Least Aware
I am aware of the Mission of NEUST	2.47	3.43	1.42	2.44	Least Aware
I am aware of the Goals and Objectives of the programs offered.	2.48	3.36	1.40	2.41	Least Aware
Overall	2.43	3.37	1.43	2.41	Least Aware

Table 3 shows that the parents or guardians are "Least Aware" while the Industry/Linkages or Cooperating Agencies are "Not Aware" on the VMGO. Since external stakeholders are focused on their own operations and activities, they are more likely not concern with the VMGO of NEUST-SIC.

As a whole, external stakeholders of NEUST-SIC are "Least Aware" of the Vision and Mission of NEUST-SIC and to the Goals and Objectives of the program offered. It shows that the internal stakeholders, especially the administrators and faculty members, are much aware, understand and accept the VMGO than the external stakeholders [2].

Table 4. Awareness on the VMGO of dissemination of Internal Stakeholders

Statement	Mean			Weighted Mean	Verbal Interpretation
	Faculty/ Administrator (n=34)	Non-teaching Staff (n=11)	Student (n=1280)		
I am aware that the VGMO are displayed in bulletin boards	3.85	3.73	3.33	3.34	Aware
I am aware that the VGMO are printed in catalogs, manuals and other materials.	3.76	3.91	3.27	3.29	Aware
I am aware that the VGMO are broadcasted in media and/or	2.91	3.82	3.13	3.13	Aware

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internet/website.					
I am aware that the VGMO are widely disseminated to the different agencies, institutions, industry sectors and the community as a whole.	3.62	3.55	3.12	3.14	Aware
Overall	3.54	3.75	3.21	3.22	Aware

Table 4 shows that the Internal Stakeholders are generally "Aware" that the VMGO of NEUST-SIC are displayed in bulletin boards, printed in catalogs, manuals and other materials; broadcasted in media and/or internet or website; and widely disseminated to the different agencies, institutions, industry sectors and the community as a whole.

The highest weighted mean is on the awareness that the VMGO are displayed in bulletin boards and the lowest is in the awareness that the VGMO are broadcasted in media and/or internet/website.

Table 5. Awareness of External Stakeholders on the Dissemination of VMGO.

Statement	**Mean**			**Weighted Mean**	**Verbal Interpretation**
	Parents (n=341)	Alumni (n=118)	Industry/ Linkages (n=106)		
I am aware that the VGMO are displayed in bulletin boards	2.50	3.36	1.51	2.21	Least Aware
I am aware that the VGMO are printed in catalogs, manuals and other materials.	2.50	3.26	1.59	2.19	Least Aware
I am aware that the VGMO are broadcasted in media and/or internet/website.	2.56	3.09	1.51	2.19	Least Aware
I am aware that the VGMO are widely disseminated to the different agencies, institutions, industry sectors and the community as a whole.	2.54	3.15	1.53	2.19	Least Aware
Overall	2.53	3.22	1.54	2.20	Least Aware

Table 5 shows that the External Stakeholders are generally "Least Aware" that the VMGO are displayed in bulletin boards; printed in catalogs, manuals and other materials; broadcasted in media and/or internet or website; and widely disseminated to the different agencies, institutions, industry sectors and the community as a whole.

The highest weighted mean is also on the awareness that the VGMO are displayed in bulletin boards but the lowest mean are from the awareness that VMGO are printed in catalogs, manuals and other materials; broadcasted in media and/or internet/website; and widely disseminated to the different to the different agencies, institutions, industry sectors and the community as a whole.

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Table 6 Acceptance and Understanding of Internal Stakeholders to the VMGO

Statement	**Mean**			**Weighted Mean**	**Verbal Interpretation**
	Parents (n=341)	Alumni (n=118)	Industry/ Linkages (n=106)		
I accept and understand the Vision and Mission of NEUST	3.76	3.82	3.54	3.55	Greatly Accept and Understand
I accept and understand the Goals of NEUST	3.65	3.82	3.49	3.50	Greatly Accept and Understand
I accept and understand the Objectives of the program where I belong and the responsibility of realizing such objectives in my own capacity.	3.76	3.73	3.31	3.32	Accept and Understand
Overall	3.72	3.79	3.44	3.45	Accept and Understand

Table 6 shows that the internal stakeholders in general "Accept and Understand" the VMGO with the responsibility of realizing such objectives in their own capacities. The faculty/administrator and the non-teaching staff "Greatly Accept and Understand" while the students "Accept and Understand" the VMGO.

The three groups have the highest means on the acceptance of the Vision and Mission and the lowest mean on the acceptance of the program objectives. It also shows that the internal stakeholders, especially the administrators and faculty members, are much aware, understand and accept the VMGO than the external stakeholders [7].

Table 7 Acceptance and Understanding of the VMGO by External Stakeholders

Statement	**Mean**			**Weighted Mean**	**Verbal Interpretation**
	Parent (n=341)	Alumni (n=118)	Industry/Linkages (n=106)		
I accept and understand the Vision and Mission of NEUST	2.37	3.32	1.36	2.43	Least Accept and Understand
I accept and understand the Goals of NEUST	2.39	3.21	1.55	2.40	Least Accept and Understand
I accept and understand the Objectives of the program where I belong and the responsibility of realizing such objectives in my own capacity.	2.44	2.97	1.57	2.39	Least Accept and Understand
Overall	2.40	3.17	1.58	2.41	Least Accept and Understand

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Table 7 shows that the External Stakeholders generally least accept and understand the Vision, Mission, Goals of the university and its objectives.

The highest weighted mean is on the acceptance of Vision and Mission and the lowest is in the acceptance of the programs objectives. Overall, the acceptance and understanding of external stakeholders to the VMGO is at "Least Accept and Understand".

Table 8 Perceptions of Internal Stakeholders regarding VMGO's clarity and consistency

Statement	**Mean**			**Weighted Mean**	**Verbal Interpretation**
	Faculty/ Administrator (n=34)	Non-teaching Staff (n=11)	Student (n=1280)		
The Vision clearly reflects what NEUST hopes to become in the future	3.79	3.73	3.39	3.40	Agree
The Mission clearly reflects NEUST's legal and educational mandate	3.76	3.73	3.34	3.35	Agree
The Goalsof college program are clearly stated and are consistent with the mission of NEUST	3.71	3.82	3.37	3.38	Agree
The Program Objectives are consistent with the goals of NEUST	3.75	3.73	3.33	3.35	Agree
The Program Objectives clearly state the expected outcomes in terms of competencies or technical skills of students and graduates	3.74	3.73	3.30	3.31	Agree
The Program Objectives clearly state the expected outcomes in terms of research and extension capabilities of students and graduates	3.82	3.64	3.25	3.27	Agree
The Program Objectives clearly state the expected outcomes in terms of students' own ideas, desirable attitudes and personal discipline.	3.79	3.82	3.28	3.30	Agree
The Program Objectives clearly state the expected outcomes in terms of moral character	3.82	3.63	3.27	3.29	Agree
The Program Objectives clearly state the expected outcomes in terms of critical thinking skills	3.79	3.63	3.29	3.31	Agree
The Program Objectives clearly state the expected outcomes in terms of aesthetic and cultural values	3.82	3.64	3.25	3.27	Agree
Overall	3.78	3.71	3.31	3.32	Agree

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As shown in Table 8, the Internal Stakeholders generally believe and agree that the Vision, Mission, Goals and Objectives are clearly stated and consistent with each other. The Faculty members and Administrators strongly agree on the clarity and consistency of the VMGO. The Non-teaching staffs also strongly agree on the clarity of the Vision and of the goals and its consistency with the Mission and agree on the clarity of the Mission and of the Program Objectives and its consistency with the goals.

The faculty members and administrators have the highest mean on the perception that the Program Objectives clearly state the expected outcomes in terms of research and extension capabilities of students and graduates; cultural values, moral character, aesthetics and the Non-teaching staffs have the highest means on the perception that the goals of the college program are clearly stated and are consistent with the Vision and Mission, and the Program Objectives clearly state the expected outcomes in terms of students' desirable attitudes and personal discipline. The students have also the highest mean on the perception that the Vision clearly reflects what NEUST hopes to become in the future and on the lowest mean is the perception that the Program Objectives clearly state the expected outcomes in terms of moral character.

Table 9. Perceptions of External Stakeholders regarding VMGO's clarity and consistency

Statement	**Mean**			**Weighted Mean**	**Verbal Interpretation**
	Parent (n=341)	Alumni (n=118)	Industry/Linkage(n=44)		
The Vision clearly reflects what NEUST hopes to become in the future	2.43	3.26	1.54	2.44	Disagree
The Mission clearly reflects NEUST's legal and educational mandate	2.53	3.19	1.58	2.49	Disagree
The Goalsof college program are clearly stated and are consistent with the mission of NEUST	2.51	3.23	1.53	2.48	Disagree
The Program Objectives are consistent with the goals of NEUST	2.54	3.28	1.52	2.48	Disagree
The Program Objectives clearly state the expected outcomes in terms of competencies or technical skills of students and graduates	2.49	3.13	1.53	2.44	Disagree
The Program Objectives clearly state the expected outcomes in terms of research and extension capabilities of students and graduates	2.53	3.16	1.57	2.48	Disagree
The Program Objectives clearly state the expected outcomes in terms of students' own ideas, desirable attitudes and personal discipline.	2.46	3.19	1.51	2.43	Disagree
The Program Objectives clearly state the expected outcomes in terms of moral character	2.48	3.18	1.60	2.46	Disagree

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The Program Objectives clearly state the expected outcomes in terms of critical thinking skills	2.48	3.28	1.65	2.49	Disagree
The Program Objectives clearly state the expected outcomes in terms of aesthetic and cultural values	2.51	3.31	1.56	2.50	Agree
Overall	2.50	3.21	1.56	2.47	Disagree

Table 9 shows that the External Stakeholders generally disagree that the Vision, Mission, Goals and Objectives are clearly stated and consistent with each other. Both Parents/Guardians and Alumni agree with the clarity and consistency of the Vision, Mission, Goals and Objectives. However, the Industry/Linkage/Cooperating Agency generally disagree on the clarity and consistency of the Vision, Mission, Goals and Objectives.

Table 10. Perception of Internal Stakeholders regarding VMGO's congruency with activities, practices, projects and operations

Statement	**Mean**			**Weighted Mean**	**Verbal Interpretation**
	Faculty/Administrator (n=34)	Non-teaching Staff (n=11)	Student (n=1280)		
There is congruency between actual educational practices and activities and the Mission of NEUST	3.71	3.73	3.24	3.26	Agree
There is congruency between actual educational practices and activities and the Goals of the University	3.71	3.73	3.26	3.28	Agree
There is congruency between actual educational practices and activities and the Objectives of the program where I belong	3.79	3.73	3.32	3.34	Agree
The projects and activities carried out by the faculty and students directly contribute towards the achievement of the program outcomes	3.76	3.73	3.34	3.35	Agree
The VMGO are the bases of all NEUST's operations	3.85	3.82	3.30	3.32	Agree
Overall	3.764	3.75	3.29	3.31	Agree

The Internal Stakeholders, as shown in Table 10, generally "Agree" that there is congruency between actual educational practices or activities and the Mission, Goals and Objectives. They also believe that the projects and activities carried out by the Faculty directly contribute towards the achievement of program outcomes and the VMGO are the bases of all NEUST's operations.

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Table 11. Perception of Internal Stakeholders regarding VMGO's congruency with activities, practices, projects and operations

Statement	Mean			Weighted Mean	Verbal Interpretation
	Parent (n=341)	Alumni (n=118)	Industry /Linkage(n=44)		
There is congruency between actual educational practices and activities and the Mission of NEUST	2.48	3.24	1.54	2.46	Disagree
There is congruency between actual educational practices and activities and the Goals of the University	2.51	3.29	1.57	2.50	Agree
There is congruency between actual educational practices and activities and the Objectives of the program where I belong	2.50	3.00	1.54	3.20	Agree
The projects and activities carried out by the faculty and students directly contribute towards the achievement of the program outcomes	2.73	3.10	1.60	2.59	Agree
The VMGO are the bases of all NEUST's operations	2.71	3.19	1.49	2.59	Agree
Overall	2.80	3.29	1.55	2.67	Agree

As shown in Table 11, the External Stakeholders generally "Agree" that there is congruency between actual educational practices or activities and the Mission, Goals and Objectives. They believe that the projects and activities carried out by the Faculty and Students directly contribute towards the achievement of program outcomes and that the VMGO are the bases of all NEUST's operations.

However, the lowest weighted means is on the congruency between educational practices and activities and the Mission of NEUST.

IV. CONCLUSION

On the Awareness of the Stakeholders regarding the VMGO, the internal stakeholders are aware of the VMGO. They are highly aware on the VMGO than the objectives of the program where they belong. While the external stakeholders are least aware of the VMGO. The industry are least aware of the Vision, Mission, Goals and Objectives.

On the Awareness of the Stakeholders regarding the VMGO Dissemination, the internal stakeholders are stakeholders are generally least aware of the VMGO are displayed in bulletin board, printed in catalogs, manuals, and other materials and widely disseminated to the different agencies, institutions, industry sectors and the community as a whole. They are more aware that the VMGO are displayed on bulletin boards and less aware that the VMGO are broadcasted in media and/or internet/website.

On the Understanding and Acceptance of the VMGO by the stakeholders, the internal stakeholders are generally understand and accept the Vision, Mission, Goals and Program Objectives, together with the responsibility of realizing such objectives in their own capacities. The Goals and Objectives of the program where they belong are the least understandable and acceptable to them than the VMGO. While the external stakeholders least understand and accept the vision, mission , goals and objectives. The LGU/ industry has the lowest mean in the acceptance of the VMGO.

On the Perception of stakeholders regarding VMGO's clarity and consistency, the internal stakeholders believe that the vision, mission, goals and objectives are clearly stated and consistent with each other. While the external stakeholders believe that the vision, mission, goals and objectives are not clearly stated and consistent with each other. However, they all agreed that the program objectives

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are clearly stated in terms of aesthetic and cultural values.

On the perceptions of Stakeholders regarding VMGO's congruency to activities, practices, projects and operations, the internal stakeholders perceive that there is congruency between actual educational practices and the mission, goals and objectives. They also believe that the projects and activities carried out by the faculty ans students directly contribute towards the achievement of the program outcomes of the university. While the external stakeholders believe that the Vision, Mission, Goals and Objectives are clearly stated and consistent with each other.

V. RECOMMENDATION

In view of the foregoing results and conclusions, the following recommendations are made:

1. NEUST-SIC should continously work in raising the awareness of its internal and external stakeholders towards its VMGO.
2. The internal stakeholders of the University should undertake activities that will bring realization of the Mission and Vision , goals and program objectives.
3. Widest dissemination of the VMGO through various forms of communication media, conduct campaigns or other related activities should be one of the concerns of the administration of NEUST-SIC to further strengthen support from external stakeholders.
4. Annual Assessment of the awareness and acceptance of the VMGO should be done.
5. The administrators, faculty members, and staff assigned to conduct educational activities should made sure that the students or the community understand that such activities are to be undertaken for the realization or attainment of some goals and objectives [2].

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Integrated Learning Module Development on Department of PGSD Students, Gorontalo State University, Indonesia

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Abstract**—** *The problems in this study are 1) What are the conditions of integrated learning objectives for students majoring in PGSD UNG? 2) How is the quality of integrated learning modules developed for students majoring in PGSD UNG? 3) What is the effectiveness of integrated learning modules for students majoring in PGSD UNG? This study aims to 1) Describe the objective conditions of integrated learning in students majoring in PGSD UNG; 2) Producing quality integrated learning development modules for students majoring in PGSD UNG; and 3) To find the effectiveness of integrated learning modules in students majoring in PGSD UNG.*

The results showed that the integrated learning objective conditions in the Department of PGSD UNG include the RPS that were designed not in accordance with the appropriate learning structure, good teaching materials were not yet owned by lecturers who were able to take courses, between lecturers supporting integrated learning subjects did not discuss each other as a team teaching so that learning outcomes are not achieved, there are no good teaching materials so students do the assignments correctly and copy and paste assignments and download them from the internet, learning so far without raising problems first to challenge students to be motivated in learning activities, Student less involved in learning, lecturers as learning centers, lack of communication between lecturers and students, students and other students, and lectures are not well structured. After doing research and development in the fourth semester PGSD Department students get better with positive student responses. The quality of integrated learning modules has met the aspects that have been determined. Quality integrated learning modules after being measured based on the characteristics of quality modules there are 5 aspects. The quality of integrated learning modules is also developed based on the input of validators who are media experts, material experts and linguists so that the quality of integrated learning modules becomes better, and the effectiveness of integrated learning modules with 4D stages has fulfilled well-defined aspects.

Keywords**— Learning Module, 4 D Development, Integrated Learning.**

I. INTRODUCTION

Primary School Teacher Education Department at Gorontalo State University, is a member of the Indonesian PGSD Lecturer Association. The PGSD Department of Gorontalo State University has adjusted the curriculum based on joint decisions in the Indonesian PGSD Lecturer Association. In the curriculum structure of the Primary School Teacher Education Department at Gorontalo State University there are courses based on the national curriculum namely Religion, Pancasila, Indonesian Language, English, Sports and Health, Citizenship, Research Methodology, Philosophy of Science, PLP1 and PLP 2, Statistics, and KKS; The University's founding subjects are Cultural Insights, Applied English, Leadership and Entrepreneurship; Faculty's distinguishing courses, namely Introduction to Education, Student Learning Development, Educational Innovation, Educational Psychology, Education for Children with Special Needs, and Educational Sociology; The subjects of the majors are Class Management, Guidance and Counseling in Elementary Schools, Learning Strategies, Media and Learning Resources, Elementary Curriculum Development, Development of Learning Materials, Elementary Indonesian Language Concepts, Basic Mathematics Concepts of Elementary 1 and 2, Basic Concepts of Social Sciences Elementary Schools, Basic Concepts Elementary School 1 and 2 Science, Basic Concepts of Civics Education, Learning Assessment, Integrated Learning, Elementary Indonesian Language Learning, Elementary Social Science Learning, Elementary Mathematics Learning, Elementary Science Learning, Elementary Civics

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Education, SBDP Learning in Elementary School, Teaching Profession, School Based Management, School and Community Relations, Global Perspectives, Regional Cultural Learning, Classroom Action Research, Scientific Writing, Thesis and 12 other elective courses.

Among several subjects majoring in primary school teacher education are integrated learning subjects. Integrated learning courses are taught with the aim of providing provision to prospective teachers of integrated learning classes in elementary schools so that they have the knowledge, experience and skills to plan and implement effective integrated learning. Integrated learning lecture material includes the nature of integrated learning, curriculum analysis, and making Learning Implementation Plans along with integrated Learning Tools in elementary schools. Integrated learning is part of the group of courses of study that must be taught to students because integrated learning courses teach students to develop Learning Implementation Plans and learning tools and are able to teach them in accordance with the national curriculum. Integrated learning subjects with learning outcomes of study program graduates are on the aspect of attitudes towards learning outcomes including 1). Demonstrating an attitude of responsibility for work in their area of expertise independently, 2). To internalize appreciative attitudes and care in the preservation of the environment, arts, and socio-cultural values that develop in the community (local wisdom); aspects of knowledge include 3). Mastering conceptual knowledge of study fields in primary schools including Indonesian, Mathematics, Natural Sciences, Social Sciences, Civics, SBdP, and PJOK, 4). Mastering curriculum concepts, approaches, strategies, models, methods, techniques, teaching materials, media and innovative learning resources as classroom teachers in primary schools, 5). Mastering the concepts and techniques of process evaluation and evaluation of learning outcomes in primary schools; aspects of general skills include 6). Able to take appropriate decisions in the context of problem solving in their area of expertise, based on the results of information and data analysis, 7). Able to be responsible for the achievement of group work and to supervise and evaluate the completion of work assigned to workers under their responsibility; aspects of special skills include 8). Applying the concept of the development characteristics of students both the development of students both physical, psychological, and social development through the design and implementation of learning in elementary schools, 9). Applying conceptual knowledge in the field of study in primary schools including Indonesian, Mathematics, Science, Social Sciences, Civics, SBdP, and PJOK through the design and implementation of learning with scientific methods in accordance with academic ethics, 10). Analyzing, reconstructing, and modifying curriculum, approaches, strategies, models, methods, techniques, teaching materials, media and innovative learning resources as classroom teachers in primary schools independently, 11). Designing and carrying out an evaluation of the process and learning outcomes in elementary schools on an ongoing basis.

Every lecturer in the Elementary School Teacher Education Department of Gorontalo State University is required to design learning systematically in order to produce a Semester Learning Plan (RPS) along with learning tools consisting of teaching materials, assignments, assessment instruments, learning media, etc. that can be carried out in the process effective and efficient learning. In accordance with the guidelines for preparing tertiary education curricula in the industrial era 4.0, Semester Learning Plans (RPS) for courses are learning process plans that are prepared for learning activities for one semester to meet the learning achievements of graduates charged to the courses. RPS or other terms, determined and developed by lecturers independently or together in a group of expertise in a field of science and / or technology in a study program.

Researchers as one of the lecturers in the Department of PGSD Gorontalo State University, teach Integrated Learning subjects. Since 2010 researchers have been taking integrated learning courses. But since then lecturers supporting integrated learning courses have not been maximized in carrying out lectures. This happens for many reasons including: 1). The Semester Learning Plan is designed not according to the right learning structure. 2). Lecturers do not have good learning materials. So far, lecturers only give lectures by asking students to find their own source books for integrated learning courses. So many books - books that they buy and download on internet pages that make them have different interpretations in this course. 3). Between lecturers supporting integrated learning courses as team teaching do not discuss each other about the whole learning process, so that if one is unable to attend, the others cannot continue learning in a structured manner that makes students confused so that the learning achievements of the course are not achieved. 4). There are no good teaching materials, so students do not do assignments correctly and copy and paste assignments or just download them from the internet. 5). Learning so far has been carried out without raising problems first to challenge students to be motivated in learning activities, 6). Lecturers without exploring the ability of students to find concepts, lecturers are still using learning as usual which results in a lack of student involvement during the learning

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process. 7). The lecturer as a learning center, students hear or record lessons, and give examples of cases where the discussion is carried out with the help of the lecturer himself, then given exercises that require students to do each of them. 8). Lack of communication among students in discussing the material being studied because the lecturer is lacking in establishing communication between students to solve the problems they face. As well as 9). Lectures on the subject matter of compiling thematic learning tools in integrated learning subjects usually do not teach the practice of systematic learning preparation from the beginning ie students describe the nature of integrated learning, analyze core competencies and basic competencies, map competencies, compile syllabi, compile learning implementation plans, create media, create media teaching materials and assessment. However, it only directly asks students to make lesson plans and teach them in front of the class without clear guidelines, which causes students to be less skilled in developing relevant integrated learning tools.

From the problems above, the researcher wants to develop teaching materials in the form of integrated learning modules that can answer all the problems that exist in integrated learning courses at the Elementary School Teacher Education Department of Gorontalo State University by conducting a research entitled: Development of Integrated Learning Modules in Department Students PGSD Gorontalo State University.

II. LITERATUR REVIEW

1. Module Definition

The module is one of the learning media in the form of a script or print media that is often used in learning activities. The module is formulated as one complete unit that stands alone, consisting of a series of learning activities arranged to assist learners in achieving learning objectives that are formulated specifically and operationally. Modules are one form of teaching material that is packaged in a whole and systematic way, which contains a set of planned learning experiences and is designed to help students master specific learning goals. Modules contain a minimum of learning objectives, learning material / substance, and evaluation. The module functions as a learning tool that is independent, so students can learn in accordance with their respective speeds. According to the Ministry of National Education (2008: 20), Modules are a set of teaching materials that are presented systematically so that their use can be learned with or without a teacher or facilitator.

Modules optimize learning resources while paying attention to learners to be able to control their learning activities. The role of educators shifts from information providers to learning facilitators by providing various learning resources needed, stimulating learning enthusiasm, providing opportunities to practice their learning outcomes, providing feedback about learning progress and helping that what they learn matches the objectives to be achieved.

2. Learning Objective Conditions that Require Modules

According to Robert Heinich, et al (in Majid, 2014), the learning process that involves the activeness of learners is reading 10%, hearing 20%, seeing 30%, seeing and hearing 50%, discussing 70%, experiencing 80%, and teaching others 95%. Thus, the teacher must prepare a good teaching tool to involve the whole sense of the learner in learning especially supporting teaching material. In accordance with the target learning process that can involve affective, cognitive and psychomotor aspects of learning are teaching materials in the form of learning modules.

The benefits of learning to use modules according to Nasution (2010: 206) are 1). Improve the effectiveness of learning because learners can learn anywhere in groups or alone, 2). Determine and set a study time that is more in accordance with the needs and development of students, 3). Strictly know the achievement of student competencies gradually through the criteria set out in the module, 4). Knowing the weaknesses or competencies that have not been achieved by students based on the criteria set out in the module so that they can decide and help participants to improve their learning and do remedial. Whereas the purpose of learning to use modules is to reduce the diversity of the learning capacities of students through independent learning activities.

3. Module Quality

Module quality can refer to quality according to Nasution (2010: 217) which states that the quality of educational products is the point of view of the development of learning material, but besides that consideration of three aspects of quality namely validity, practicality and effectiveness can be used on a wider product range.

According to Nasution, (2010: 231), validity refers to the level of intervention design based on knowledge of content validity and construct validity. Validity is a measure that shows the validity of an instrument or data. The principle of validity is measurement or observation in collecting data.

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4. Module Effectiveness

Module development must pay attention to the characteristics required as an effective module. According to Chomsin S.W. and Jasmadi (2008: 50), the characteristics of a good module are: a). Self Instruction, b). Self Contained, c). Stand Alone (Stand Alone), d). Adaptive, as well as e). Friendly / Familiar (User Friendly)

5. Module Compilation Procedure

The module preparation process consists of three main stages. First, determine learning strategies and appropriate learning media. At this stage, it is important to pay attention to the various characteristics of the competencies to be learned, the characteristics of the students, and the characteristics of the context and situation in which the module will be used. Second, produce or realize physical modules. The component contents of the module include the following: learning objectives, required learners' requirements, substance or learning material, forms of learning activities and supporting components. Third, develop assessment tools. In this case, it is necessary to make sure that all aspects of competency (knowledge, skills and related attitudes) can be assessed based on certain criteria that have been set.

So in development research, indicators to state that module implementation is said to be effective can be seen in the components that accompany it. Like the learning outcomes of students and the process of student activity. In this developmental research, the researcher measures the effectiveness of the module from the student's final learning outcomes and the student's activity process using the module.

6. Module Advantages and Weaknesses

Modules have advantages as stated by Vembriarto (1981: 25). The advantages of using modules in the teaching and learning process include:

1) Overcoming the limitations of time, space, and senses, both students and teachers.

2) Can be used appropriately and varied, such as to increase motivation or enthusiasm for learning, develop the ability to interact directly with the learning environment.

3) Allows students to be able to measure or evaluate their own learning outcomes.

4) Students are more active in learning.

5) The teacher can act as a guide, not merely as a teacher.

6) Getting students to believe in themselves.

7) There is a healthy competition between students.

8) Can ease the burden on the teacher.

9) Learn more effectively, and evaluate significant improvements.

10) This system can absorb the attention of children so that lessons show are more successful when compared with lectures.

Learning to use modules has many benefits, students can take responsibility for their own learning activities, learning with modules highly values individual differences, so students can learn according to their ability levels, so learning is more effective and efficient.

b). Weaknesses of Module Use

Modules have weaknesses as stated by Vembriarto (1981: 25). Weaknesses of the use of modules in the learning process as stated by Vembriarto include:

1) Difficulties in students cannot be overcome immediately.

2) Not all students can study on their own, but need teacher's help.

3) Not all materials can be modulated and not all teachers know how to implement learning using modules.

4) The difficulty of preparing materials and requires a lot of costs in making modules.

5) There is a tendency for students not to study the module well.

Learning by using modules is also often referred to as independent learning. According to Suparman (1993: 197), states that this form of independent learning activities has the following shortcomings:

1) The cost of developing materials is high and it takes a long time.

2) Determine high learning discipline that students may not have in general and students who are not yet mature in particular.

3) Requires greater perseverance from the facilitator to continuously monitor student learning processes, provide motivation and individual consultation every time the student needs.

Tjipto (1992: 72), also revealed a number of things that burdened learning by using modules, namely:

1) Learning activities require good organization

2) During the learning process several tests / examinations need to be held, which need to be assessed as soon as possible

Based on some of the opinions above, it can be concluded that in learning to use the module also has some fundamental weaknesses, namely that it requires a large

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amount of cost and requires a long time in the procurement or development of the module itself, and requires high persistence from the teacher as a facilitator to continue to monitor student learning process.

7. The Nature of Integrated Learning

Integrated Learning or commonly referred to as thematic learning is an approach to learning that deliberately links several aspects both within intra subjects and between subjects. With this integration students will gain full knowledge and skills so that learning becomes meaningful for students. Meaningful here means that in thematic learning students will be able to understand the concepts they learn through direct and real experience that links between concepts in intra subjects and between subjects.

Integrated learning is based on an approach that involves students ranging from planning, exploring, and brainstorming and concluding. With an integrated approach, students are motivated to learn and work in groups and learn from the results of their own experiences. Furthermore, in its implementation children can be invited to participate actively in exploring and elaborating themes, topics or events, students learn the process and content (material) of more than one field of study at the same time. This theme or topic or event development activity is important in developing students' systematic and systematic thinking skills.

Several other integrated / thematic learning definitions were put forward by integrated / thematic learning experts among them:

a. According to Beans (Sa'ud et al: 4) integrated learning is an approach to develop children's abilities in the formation of knowledge based on interactions with the environment and experiences in their lives;

b. According to Jacobs (Sa'ud et al: 5) integrated learning is an approach in learning as a process for linking and integrating teaching material in a subject or between subjects with all aspects of child development, the needs and interests of children, as well as the needs and demands of the environment social family.

c. According to Prabowo (2000: 2), integrated learning is a teaching and learning approach that involves several fields of study. Teaching and learning approaches like this are expected to be able to provide meaningful experiences to students. Meaning here because in the thematic learning it is hoped that children will gain an understanding of the concepts they have learned through direct experience and relate them to other concepts they already understand.

From the above understanding it can be concluded that integrated learning is a teaching and learning approach that pays attention and adapts to the level of development of students (Developmentally Appropriate Practical). In accordance with the stages of student development, ways of student learning, concepts of learning and meaningful learning, learning activities should be carried out using an integrated learning approach. Integrated learning is a learning approach that uses focus or themes to link several subjects so as to provide meaningful experiences to students. Bredekamp in (Developing Appropriate Practice 1987), explains that integrated learning is a learning approach that uses a center of interest in the form of a focus or theme or concept, which serves as a binding force for cohesiveness to form a new concept that is meaningful to a child's life and is relevant to a given concept. The center of interest as the core of the study should be lifted from essential concepts or problems in students' daily lives. This will be very meaningful for student life. Through direct experience and connecting with other concepts that are already owned, students will be able to build their understanding of new concepts in greater depth.

Based on the description above, it can be concluded that the notion of integrated learning is 1) Learning that starts from the existence of a center of interest that is used to understand the symptoms and other concepts, both originating from the field of science itself and from the field of science other; 2) A way to develop students' knowledge and skills simultaneously; and 3) A learning approach.

Integrated learning is very concerned about the needs of children in accordance with their development, namely by actively involving in the learning process both physically and emotionally. For this reason, the activities provided include active searching, exploring, and discovering concepts and principles of science that are holistic, meaningful, and authentic so that students can apply learning outcomes to solve real problems in daily life. The learning process should provide a variety of activities and materials that are diverse and offer choices for students so that they can choose them for small and independent group activities and provide opportunities to take their own initiative, perform skills on their own initiative as the activity they choose.

8. Excellence and Limitations of Integrated Learning

Integrated learning has advantages over the conventional approach, which is as follows.

a. The experiences and learning activities of students will always be relevant to the level of child development.

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b. The selected activity can be adjusted to the interests and needs of students.

c. All learning activities are more meaningful for students so that learning outcomes will last longer.

d. Integrated learning fosters students' thinking and social skills.

e. Integrated learning presents activities that are pragmatic with problems that are often encountered in the real life / environment of students.

f. If integrated learning is designed together, it can improve cooperation between teachers in the related field of study, teachers and students, students with students, students / teachers with resource persons; so learning is more fun, learning in real situations, and in more meaningful contexts.

In addition to the above advantages, integrated learning has limitations, especially in its implementation, namely in the design and implementation of evaluation which requires more teachers to evaluate the process, and not only evaluate the impact of direct learning.

Through integrated learning, students can gain direct experience, so they can add strength to receive, save, and apply the concepts they have learned. Thus, students are trained to be able to discover for themselves various concepts that are studied thoroughly (holistically), meaningful, authentic and active. The way the packaging of learning experiences are designed by the teacher is very influential on the meaningful experience for the students. A learning experience that shows the relationship between conceptual elements will make the learning process more effective.

Integrated learning provides opportunities for teachers and students to develop learning that is intact, comprehensive, and meaningful in accordance with the expectations, abilities, and needs of students.

9. Development Research Procedure

Four-D or 4 D models can generally be seen as models for instructional development (a model for instructional development). The development of the Four-D model is based on instructional development by Twelker, Urbach, and Buck (Thiagarajan, Semmel, and Semmel, 1974) with stages: analysis, design, and evaluation. Initially Thiagarajan, Semmel, and Semmel (1974) modified this model into four stages, namely: analysis, design, evaluation, and dissemination. Furthermore, this design after going through a process of revision and development in the training conducted is called the Four-D model which includes four stages: define, design, develop, and disseminate.

The definition phase (define) includes five phases: (1) initial-end analysis (front-end analysis); (2) learner analysis; (3) task analysis; (4) concept analysis; and (5) specific instructional objectives (specifying instructional objectives). The design phase includes four phases: (1) constructing a constructing criterion-referenced test; (2) media selection (media selection); (3) format selection; and (4) initial design. The development phase includes two phases: (1) expert appraisal; and (2) developmental testing. The dissemination phase includes three phases: (1) validating testing; (2) packaging; and (3) diffusion and adoption. (Rocmad, 2012: 61)

Development of learning media involves a number of steps that must be taken by a developer in learning in order to obtain good learning materials in accordance with the characteristics of students. This is important to do so that the learning process is more effective in its process, time and cost.

In the preparation and development of this media must be done with the right procedures so that it can be clearly identified what must be done. One model of media development that can be selected as a guideline in the preparation of instructional media is the Four-D development model suggested by Thiagarajan, Semmel, and Semmel. The Four-Dmodel media development model suggested by Silvasailam Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel uses the Four-D learning system. This model consists of 4 stages of development, namely Define, Design, Develop, and Desseminate or adapted into a 4-P model, namely Defining, Designing, Developing, and Disseminating (Trianto, 2007: 65).

III. RESEARCH METHODS

This research was conducted in the Department of Primary School Teacher Education (PGSD) Gorontalo State University. This research was conducted in the even semester of the 2018-2019 school year.

The datacollection technique that will be used to support problem solving are, as follows: a)questionnare, b) interview, c)documentation. The data obtained will be analyzed using descriptive statistical analysis then data that has been analizedquantitatively are deepened or strengthened by result of interview.

IV. RESULT

A. Objectives of Integrated Learning Objectives in the PGSD Department of Gorontalo State University

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The integrated learning objective conditions in the PGSD majors in Gorontalo State University based on the analysis of the results of observations and interviews are categorized in three forms, namely planning is not in accordance with learning outcomes, the implementation is still carried out without using the learning module, and still uses many learning resources so that it does not focus on learning and assessment.

Pre-research activities theoretically begin with the needs of students, namely by analyzing whether there is a mismatch between the current state of students and the needs of students, and determining learning objectives. The steps taken are conducting discussions with the team teaching integrated learning subjects to discuss the problems that exist in lectures on integrated learning courses. From this team teaching discussion, the author is interested in developing a learning module that is an integrated learning module for students majoring in PGSD UNG. The author has developed an integrated learning module that aims to be used in integrated learning subjects and also aims so that students can study independently and can also learn face to face with their lecturers.

V. RESEARCH RESULTS AND DISCUSSION

A. Objectives of Integrated Learning Objectives in the PGSD Department of Gorontalo State University

The integrated learning objective conditions in the PGSD majors in Gorontalo State University based on the analysis of the results of observations and interviews are categorized in three forms, namely planning is not in accordance with learning outcomes, the implementation is still carried out without using the learning module, and still uses many learning resources so that it does not focus on learning and assessment.

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The basic principles in developing this learning module are 1). Helping students focus on their learning resources, 2). Helping students prepare for independent learning, 3). Have a learning plan that can be responded to maximally, 4). Contains learning content that is complete and able to provide student learning opportunities, 5). Can monitor student learning activities, and 6). Can provide advice and guidance as well as information on the level of student learning progress.

B. The Quality of Integrated Learning Modules Developed by Students of the Department of PGSD UNG;

To find out whether the integrated learning modules in the Department of PGSD UNG are qualified or not, an assessment of the material, media and language is carried out by experts. The results of the analysis of the content validity of each item calculated using the Aiken formula, with the number of panelists / validators as many as 7 people and the number of scores for the rating choices on each item are 5 starting from 1 (lowest score) to 5 (highest score), obtained that the validation index all items between 0.54 - 1.00 with a "valid" conclusion.

The overall steps of the research to produce quality integrated learning modules have been carried out well. Data on expert assessment of Integrated Learning Modules, based on aspects of content eligibility, aspects of material presentation, which is contained in the Integrated Learning Module instrument.

This integrated learning module already contains the characteristics of a quality module so that the writer believes that this integrated learning module is a quality module.

C. The Effectiveness of Integrated Learning Modules in the PGSD UNG Department.

The effectiveness of integrated learning modules is analyzed using the Semester Learning Plan (RPS), Student Activity Sheets (LKM), and Integrated Learning Modules.

For data analysis using descriptive qualitative and quantitative descriptive data analysis. Qualitative data analysis is used to describe the results of preliminary observations before designing the learning module and the results of the preparation of the learning module and describe the suggestions that have been given by the validators, expert lecturers to perfect the learning module that has been made. Whereas for quantitative data analysis it is used in idealized research and the level of feasibility of the learning modules assessed by expert lecturer validators. The results of the small group test and field trial use the

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tabulation of respondent results in the form of a percentage.

VI. DISCUSSION

Integrated Learning Module with the 4D Model

The 4-D (Define, Design, Develop and Desseminate) development research conducted by researchers has clear, systematic and directed steps making it easier for researchers to develop integrated learning modules. The 4D development model consists of define, design, develop while the researchers disseminate stages are limited to the UNG campus environment due to time and cost considerations.

The learning module validator on integrated learning materials consists of several experts, namely lecturers, and experts (media, content and so on). After the learning module has been validated, a revision is made. From the results of the revision of the validator's study then a small group trial was conducted. Furthermore, the results of the small group trial were revised again and then tested on a field trial of 40 PGSD UNG students. In addition, it is not denied to assess the feasibility of the learning tools of the participation of lecturers and students of PGSD UNG also needed.

VII. CONCLUTION

The conclution showed that, the learning modules that have been designed by researchers and validated by experts obtained the results in the form of valid and reliable learning modules with conclusions very feasible to use. The results of the validation carried out by the experts in the form of suggestions or input accompanied by an assessment of each module. Expert advice or panelists are processed statistically to be the basis for making decisions whether the module is valid and reliable.

Based on the conclution above, the following implications are: 1. Learning using Integrated learning modules in students majoring in PGSD can be applied to other learning. 2. Learning by using an Integrated learning module in PGSD majors students can improve the learning abilities of PGSD majors students. 3. Integrated Learning Modules can be used as an alternative to the development of other course learning modules.4. The Integrated Learning Module needs to be a concern for lecturers for the better achievement of student learning abilities.

New innovations are needed in the world of education, especially education, because it does not rule out the development of research that has been done by researchers will emerge similar research even better from various aspects to improve the quality of education.

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