IMPROVING TECHNICAL DRAWING SUBJECT AT SEETA HIGH SCHOOL – MUKONO DISTRICT

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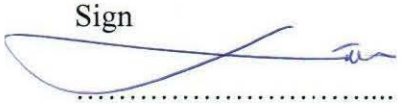
A DISSERTATION SUBMITTED TO KYAMBOGO UNIVERSITY GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER DEGREE IN VOCATIONAL PEDAGOGY OF KYAMBOGO UNIVERSITY

AUGUST, 2021

DECLARATION

I GUMA LAWRENCE, student of Kyambogo University Reg. No. 16/U/14009/GMVP/PE Hereby declare that this research entitled "IMPROVING TECHNICAL DRAWING SUBJECT AT SEETA HIGH SCHOOL – MUKONO DISTRICT", is my original piece of work and has never been presented to any institution of higher learning for the award of any degree.

Sign



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GUMA LAWRENCE

APPROVAL

This is to acknowledge that this research report entitled "IMPROVING TECHNICAL DRAWING SUBJECT AT SEETA HIGH SCHOOL – MUKONO DISTRICT." is submitted with the approval of the undersigned research supervisors.

DR. OTAALA JUSTINE..... 25 / 8 / 2024

Principal Supervisor Date

ASSOC. PROF. EJUU GODFREY..... 20 / 8 / 21

Second Supervisor Date

DEDICATION

This work is dedicated to my dear wife Mrs. Stella Alice Kirungi Guma and our beloved children Sarah, Edith, Gift, Destiny, Max, Joel, Nicholas, Gavin and Lucas who have withstood my absence for this period I have been engaged.

ACKNOWLEDGEMENTS

I thank the Almighty God for the gift of life and for seeing me all through these two years of my study in Kyambogo University. I would like to extend my sincere gratitude to all the people whose works and efforts have made documentation of this master thesis a success. The experiences acquired will continue to enrich my repertoire of knowledge and career development for the service of the society.

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Many thanks go to the administrators of Seeta High School for allowing me to carry out this research. I am also grateful to the old students of Technical Drawing of Seeta high school for your participation and contribution in this research. The experiences I have acquired while working with you will always bear significant memories in regard to developing my practical ability in facilitating learning.

To my dear wife **Mrs Guma Alice Stella** for the moral support and for the energy and effort put into proofreading of this work. I will always cherish your contribution towards the development of this report. I am greatly indebted to my mentor **Dr. Elizabeth Opit** for her dedicated efforts to guide and direct me throughout this thesis and my entire study in this Master's program. Without your support this project work would have weighed me down into total shambles. I am also grateful to **Dr. Ejuu Godfrey**, **Dr. Otaala Justine *(RIP)*, Mr. Serwaniko Chris** for their tremendous support during my study.

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LIST OF ACRONYMS

FW:	Future Workshop
HOD:	Head of Department
MVP:	Master in Vocational Pedagogy
SHS:	Seeta High School
TD:	Technical Drawing
UNEB:	Uganda National Examinations Board
VET:	Vocational Education and Training
UIRI:	Uganda Industrial Research Institute

ABSTRACT

The purpose of this Research was to improve Technical Drawing (TD) as a Subject at Seeta High School, in Mukono District. The study involved students, teachers, parents and administrators, as the population. The strategies adopted included; formulation of a TD club, involve parents, carry out a TD exhibition, improving the learning environment and conducting study tours. The research employed a participatory action research approach and a qualitative research design that is descriptive in nature. The methods of data collection employed included interviews, observation, and documentary analysis. The data analysis process constituted transcription of field data following the objectives of the project. The Researcher presented, interpreted and discussed data findings based on personal reflection on collected data and interpretation with a backing of scholarly views. The main findings revealed that besides excelling in the grades of TD from (2012-2017) the outlook of the Subject in the school should have been visible.

CHAPTER ONE: INTRODUCTION

1.0 Overview

This action research thesis focused on improving Technical Drawing subject in Seeta High School – Mukono District. The introductory chapter of this research thesis presents; Vocational Training as a field of study, the background to the study, statement of motivation, situation analysis, statement of the problem, purpose of the study, objectives of the study, research questions, justification of the study, significance of the study, scope of the study, and definition of operational terms.

1.1. Vocational training

Many scholars use the term vocational training to mean; vocational education and training, workforce education, Education for work or technical vocational education and training (UNESCO-UNEVOC International Centre, 2014; Education International, 2009; European Commission, 2014). The difference in my opinion is that vocational training is more hands on and less concerned with theoretical conceptualization of aspects under study while vocational education, embraces skills beyond practice, to involve other skills like critical thinking, marketing, and theoretical knowledge on the studied phenomenon.

Skills portal (2016), defines vocational training as education or training that prepares one for the day-to-day duties that one will be doing in their specific trade, craft, profession, or role. It equips one with real skills, as opposed to theoretical knowledge. Vocational training equips learners with hands-on skills that are required in specific trades and crafts. Traditionally, vocational training in the Ugandan perspective would refer to education and training of such fields like carpentry, bricklaying, construction and agriculture. Modern times have changed the way we understand vocational training to mean almost all trades of education by putting an emphasis on the hands-on training rather than theoretical knowledge generation.

1.2. Background of the study

The background of this study is presented in two subsections; personal background and experience, and background of technical drawing.

1.2.1. Background of technical drawing.

Technical Drawing is the art and discipline of composing drawings that visually communicate how something functions or is constructed. UNESCO - NIGERIA (2008), Technical drawing as a field of study concerned mainly with using lines, circles, arcs and shapes to illustrate general configuration of an object. It is a language of communication between Architects and Engineers, usually to convey information about the object. However, it is very important that the drawing produced is accurate and clear to the person who will eventually use it. The ability to read and understand drawings is a skill that is very crucial for students offering TD.

Technical Drawing therefore, is the skill of creating a plan such that a person can visualize and follow how it needs to be carried out. The person who creates these drawings is known as a draughtsman, draftsperson, or drafter and if the person is a professional, he or she is then known as a drafting technician. From various conversations through group discussions, participants brought up a number of ideas. For example, Jesse, a former student of Seeta High School – Main campus, asserts that

> "...technical drawing also referred to as engineering drawing is that drawing which requires a certain level of neatness and discipline, without which your drawing would not be up to the mark. You need to maintain presence of mind in making multiple calculations about which edge would be visible and which one would be invisible. Visualization is key to the success of a student in this subject. Space and time management are vital in the examinations. These are the key qualities inculcated in a student 15th June 2018..."

Technical Drawing is a less desired subject at Seeta High Schools since few students opted for it at 'A' level. The decision on which subjects to take at Advanced Level, is

influenced by parents majority of whom have no idea what Technical Drawing is all about. In an effort to help students who would have missed a subject due to insufficient information, students are allowed to attend various subjects. This helps them to get acquainted with the subjects thus making informed choices about their subject combination. As Towline Timothy, a S.5 student asserts "...I wish I had guidance from my class teacher about the importance of TD because I feel more comfortable with Technical Drawing than with Chemistry which I tried out first..." (Group discussion, 2018). My observations revealed that Towline was more relaxed in TD after he was given an opportunity to try out the subject. He is currently performing better in TD compared to other subjects related to engineering courses at a higher level of learning. This was mainly because of the perceived and intended attitudes from learners, school administrators and the general public. This is shared by Kozik (2015) who observed that TD is seen as the aspect of the long-term stability of society and its development, however, its importance in lower level schools was pushed behind. Negative attitudes towards the teaching of technical subjects could be observed among students, teachers and school management at Seeta High School.

1.3. Statement of motivation

My experience as a technical drawing teacher as well as a civil engineer practicing in the designs of different concepts of structures, has placed me in a position to observe the importance of having Technical Drawing taught in secondary schools at both ("O" and "A") levels. In secondary schools Technical Drawing is vital for students' development of creative, technical and relational abilities. These skills are very vital for students with interests in the technical and science fields in higher levels of learning. The researcher has ardently observed various challenges associated with learners' ability to gain desired competences in the field of Technical Drawing. The exposure to MVP programme has also equipped the researcher with

incalculable knowledge and skills in action research which has laid a foundation for conducting this study.

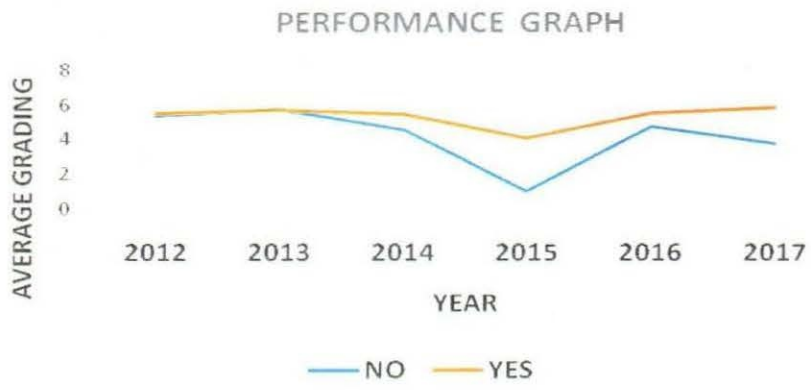
1.4. Situation analysis

The researcher's status as a Technical Drawing teacher at Seeta High School – Main campus, influenced his desire to inquire into the outlook of the subject. Teaching TD in a secondary school has been rather more challenging than anticipated. This is because of various challenges associated with the subject. One of the challenges being a negative attitud school administrators, parents and students, have on the subject. The researcher has been privileged to interact with people in the science section in the world of work, who appreciate the importance of TD to their careers. This therefore profoundly influenced the researcher into investigating TD at Seeta High School – Main Campus. The inquiry started through observation as a method of data collection where students' enrolment into TD classes, over the years, was investigated. In this inquiry, the researcher and the stakeholders (teachers, students and administrators) observed a number of aspects pertaining to the status of Technical Drawing as a subject in Seeta High School. This included enrolment into TD [the interest was placed on comparison between enrolment into TD at A level, between former students at Seeta High and those coming from other schools]. The enrolment considered various academic years. Performance in TD at Uganda Advanced Certificate of Education [the researcher's interest was to compare the performance of students who had a background of TD at O level and those who did not have any]. Both enrolment and performance explored various years of 2012 to 2017 and only concentrated on TD as a subject. During the situation analysis, it was observed that students with a TD background performed better at Advanced level than those who had no background.

Table 1: UACE performance of students in TD between 2012 – 2017

YEAR	Average performance of students without 'O' Level TD background 6 points (A)	Average performance of students with 'O' Level TD background 6 points (A)
2012	5.3	5.5
2013	5.7	5.7
2014	4.5	5.4
2015	1	4
2016	4.7	5.5
2017	3.7	5.8

The figures under the performance column, represent an average on the total performance of students in a particular year. The average is placed against the national standard grading of (1 – 6) points (O – A), in the UACE grading system.



Key: Students with O level TD background

Students without O level TD background

Figure 1: Showing a graph on the average performance of TD students (UACE), (2012-2017)

The researcher examined performance in various academic years (2012 – 2017) between students who had an 'O' level TD background and those who did not. The figure reveals that students who had done TD at 'O' level performed much better in 'A' level compared to those who had not done it before. The results of UACE determine which courses

a student would do at a higher institution of learning. This means that, if a student has an interest in an engineering course for example, civil engineering, it is a requirement to have a principal pass in TD at UACE. To get a principal pass, a student must score between (2 and 6), equivalent of (E –A), Uganda National Examinations Board (UNEB) ranking.

In 2015, students who had not done TD at O level performed poorly thus failing to raise a principal pass in TD as evidenced in the data presented (see table 1). Following the disparities in the performance for the students who had done technical drawing in 2015 and industrial action was carried out by the administration to carefully reintroduce the subjects to the learners in senior five class. However, the enrolment of TD students into senior five for 2015, was low compared to the previous years as illustrated in table 2.

Table 2: Enrolment of UACE students in TD between 2012 – 2017.

YEAR	From other schools other than Seeta high.	From Seeta High School
2012	6	1
2013	8	1
2014	8	2
2015	2	1
2016	6	1
2017	6	2

Table 2 shows enrolment in TD class at A level, from (2012 – 2017). It compares students enrolled for TD class in senior five from other schools and those who joined from Seeta High School – Main campus. The two comparisons are quite shocking as clearly seen in the table above. Table 2 revealed that 88% of TD students over the years, come from schools other than Seeta High School.

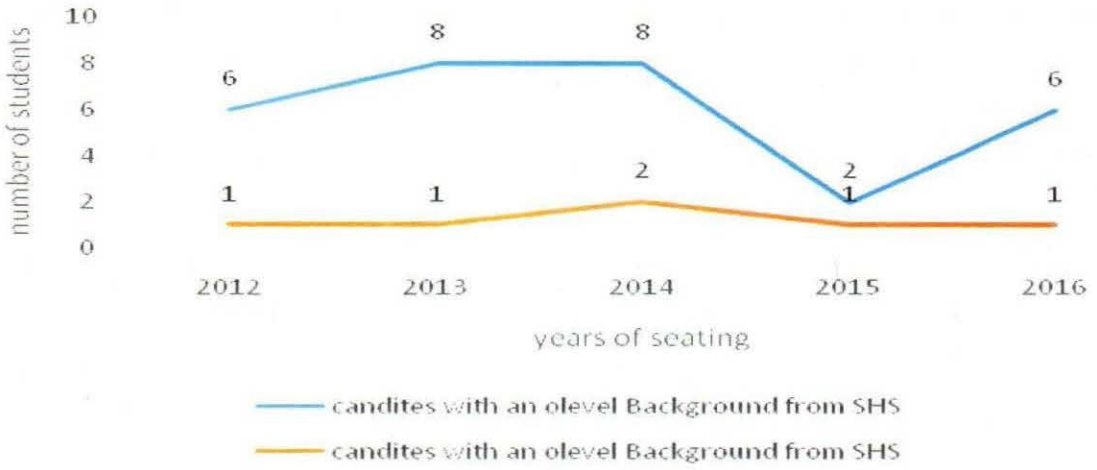


Figure 2: Enrolment of TD students (UACE), (2012-2016) in Seeta High School

Source: Primary source, Seeta High School (2018)

From figure 2, majority of TD students at "A" level in Seeta High School – Main campus, came from other school. From 2012 to 2017, the enrolment has been only one student from Seeta High School – Main campus each year, with exception of 2014 and 2017, which registered two students each.

Following the above statistics, it is evident that students with a background of TD at 'O' level, performed better than those that never had any experience. It is also evident that, since Seeta High School does not offer TD at "O" level, it affected the performance of students who opted for it at 'A' level.

Further informal interviews and discussions revealed that majority of students at both 'O' and 'A' levels, were not aware of the importance of TD to prospective science students. This is also true with administration and parents, a reason why TD is not highly considered at Seeta High school – Main Campus.

It was also clear that the attitude of students towards TD was negative. Most of the students preferred subjects that are less demanding, unlike TD that requires ardent

concentration and investment in terms of materials and tools. This affected some students especially those who depended on their guardians to provide scholastic materials, as most of the parents had already been strained with the needs of other subjects, hence choosing to forego TD.

Therefore, to mitigate the above challenges and be able to find possible solutions, a deeper and more concrete discussion was necessary. The researcher sought to use the futures workshop meeting as a strategy to have meaningful discussions as it advocates for inclusive and objective discussions.

Future Workshop meeting:

The future workshop meeting was held at Seeta High School – Main campus on 10th March, 2018 in the computer laboratory. The participants in this Workshop meeting included one administrator, four teaching staff, six old students of Seeta High School – Main campus, and thirty current learners of the school. The workshop was intended to draw and engage stakeholders in a deeper and constructive discussion about the status of TD in the school. The researcher presented a critical question to stakeholders which was intended to find out why TD as a subject was highly under-looked by students, administrators and the general public. During the discussion, stakeholders revealed various reasons which included; lack of career guidance, lack of interest in the subject by school administration, scarcity of TD teachers in the school, few schools that offer TD, lack of professional guidance from professional TD personnel, poor attitude towards TD by students, parents, teachers and general public, TD not offered at the Ordinary Level section of Seeta High School – Main campus. These challenges ushered us into a brainstorming stage, where possible solutions to overcome the above challenges were suggested.

During the brainstorming, stakeholders suggested a number of solutions to the challenges generated. These included; to establish career guidance at school, administrators

should listen to the opinions of the students, employ more TD teachers, introduce TD in various schools, have professionals in TD come to the school for career guidance, invite former students who offered TD for career guidance, consider subject combination, bench marking, TD should be introduced in O level, make TD subsidiary for those intending to do engineering courses.

The above solutions were condensed into three themes; Career Guidance, Management, and Technical Drawing Class. This was to enable the stakeholders focus on one particular challenge, which was most pressing and solvable, within the research timeframe and with the resources available. The themed solutions were further subjected to a Pairwise Matrix voting to determine the most pressing issue. From the Pairwise Matrix voting (see Appendix B), majority of members agreed that Technical Drawing class was the most pressing issue at hand. This included the need to carry out activities which would be done to ensure that the status of TD as a subject at Seeta High School – Mukono District, is improved. These activities were to be done corroboratively by stakeholders.

The discussion further sought to look for strategies that can be done under the Technical Drawing class, in order to improve the status of the subject in the school. A number of strategies were highlighted and agreed upon by all stakeholders. These included; forming a TD club, involving parents in TD discussion for awareness, holding a TD exhibition, improving on the TD class room conducting TD classroom tours, and forming a TD association in the school. Stakeholders further agreed on a work plan on which the researcher, together with stakeholders, would achieve the suggested strategies (Refer to appendix C)

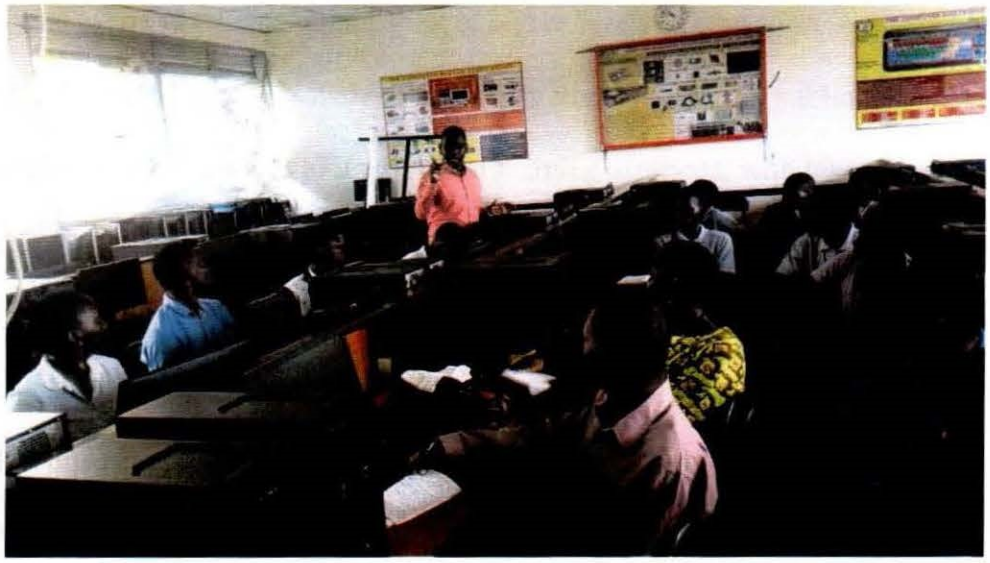


Figure 2: Showing Seeta High School old student presenting

Source: Field data, Seeta High School main campus Computer lab (2018)

1.5. Statement of the problem

Technical Drawing (TD) as a field of study is one of the core components required for learners to develop competencies and skills in communication and critical thinking. It is vital for the foundation, development and communication of ideas related to technology, industry and scientific development (Central Dauphin High School, 2018). Despite its importance to a learner, TD has not been appropriately considered as a vital requirement especially to students intending to pursue engineering courses as career pathways. This has been evident with the number of students who have opted for TD at A level (refer to table, on the enrolment at SHS). More so, TD at SHS has not been well facilitated in terms of exposing students to field trips, study tours and seminars because of the restrictive budgeting process of the institution. Similarly, TD has been understaffed for a long time. There is only one teacher for the subject in the whole school, yet TD has three different papers examined at 'A' level for the Uganda National Examinations Board (UNEB).

There is a challenge of a negative attitude from administration, students and parents towards the subject. Many have no idea of the importance of the subject especially to certain

students who aspire to take up engineering at higher levels of education. A need to improve the status of the subject among students, administrators and general public, is paramount as this, if not handled will lead to higher level of learning aspirants, with less or no basic knowledge and skills in an important subject, of which this guides the career growth of learners at higher levels of learning. Therefore, this study helped in increasing the awareness of the importance of TD as a subject at Seeta High School.

1.6. Purpose of the study

The purpose of this study was to improve Technical Drawing subject at Seeta High School-Mukono District.

1.7. Objectives of the Study

The objectives to this study were;

1. To develop strategies to improve Technical Drawing subject in Seeta High School in Mukono District.
2. To implement strategies to improve Technical Drawing subject in Seeta High School in Mukono District.
3. To evaluate the impact of implemented strategies aimed at improving Technical Drawing subject in Seeta High School in Mukono District.

1.8. Research Questions

The research questions were;

i. What are the possible strategies to improve Technical Drawing as a subject in Seeta High School Mukono District?

ii. How can the identified strategies be implemented to improve Technical Drawing as a subject in Seeta High School Mukono District?

iii. How can the intervention strategies be evaluated to show the extent of how the outlook of Technical Drawing has been improved.

1.9. Justification of the study

Technical drawing is a fundamental subject in the development of a learner. This view is shared by Central Dauphin High School (2018) who hold that technical drawing is vital for the inception, development and communication of ideas related to technology, industry and scientific development. Learners, school administrators and parents need to be fully exposed to the possibilities and relevance of technical drawing to the future career pathways. This improved the attitudes and motivation towards the subject. For example, according to Paramour (2018) engineering graphics, also a component of TD, provide means to expression of thoughts and concepts involving geometrical shapes and design between the designers (engineers) and fabricators (vendors). In other words, drawing is a tool to communicate ideas, its importance according to (Paramaguru, 2018), include; visual communication between (draftsmen and engineers/other professionals, designers/architects and manufacturers/contractors, end-users and sales/support services), and transmission of coding technique among many uses. Paramaguru (2018) further brings out TD's relevance to guide engineers to describe ideas and present them to other professionals through engineering graphics, read and understand graphics prepared by others.

On the other hand, (Deshmukh, 2015) agrees that technical drawings are very important, even if they are not used as the main source of drafting and designing anymore. With CAD software, some might consider technical drawings outdated and useless. That is not the case, however. These drawings are still very important Invention start with technical drawings. A successful, quality object cannot be adequately built or manufactured without the assistance of Technical Drawing Designs.

Deshmukh (2015), further contends that a technical drawing is the instruction manual for something that needs to be built or manufactured. It is exact in offering a visual representation of what it's intended to be, in detail. It clearly communicates specifications of

the idea. Once the technical drawing is created, the manufacturer has a concise idea of how to create the item in physical form.

1.10. Significance of the Study

The study significantly improved the researcher's skills and competences in not only conducting action research but also communication and interpersonal skills. The study consequently revitalized TD as a subject which was in the long run improved the outlook of the subject in the school. The study further contributed knowledge in the field of technical drawing where schools drew insight on the importance of technical drawing to learning. Students, as primary beneficiaries to this study gained invaluable skills, knowledge and attitudes towards TD, but also they gained a vital insight on the importance of TD in relation to their career aspirations. For the community this research opened up the various innovations done at school like building prototypes which in turn were used by the home community to always refer to the town councils before putting up structures they have to be approved by the local authorities.

1.11. Scope of the Study

The scope of this study explored the geographical location, content, and the time frame for the study.

1.11.1. Geographical scope.

The study was conducted at the Technical Drawing Department in Seeta High School main campus. Seeta High School is located in Seeta town, Mukono District, roughly 17 Kilometres from Kampala along Kampala – Jinja Highway.

1.11.2. Content scope.

The content scope of this study was based on the research objectives of the study; The research critically examined Technical Drawing as a subject in secondary school. The researcher further explored the importance of Technical Drawing to learning, its relevance to

engineering courses at higher institutions of learning, challenges as why the subject is not emphasized and possible solutions to the challenges.

The researcher explored different strategies aimed at revitalizing technical drawing in secondary school, and investigate implementation the developed strategies while reflecting on the processes involved.

The researcher explored different evaluation strategies and methods. The researcher further examined the impact of the implemented strategies, while drawing conclusions and giving recommendations.

1.10.3 Time frame.

This study was conducted from April to October 2018.

1.12. Definition of operating terms

Action research: (Lesha, 2014) refers to action research as a model of professional development that promotes collaborative inquiry, reflection, and dialogue. "Within the action research process, educators study student learning related to their own teaching. Lingard (2015) on the other hand, looks at action research studies in a more elaborative way, in his opinion, action research, (also referred to as community based research, participatory action research, or collaborative inquiry), is not done on or with participants; research is designed, carried out, and integrated by the participants in partnership with the researchers. Based in emancipator social theory and designed to democratize the research process, action research is an iterative process in which researchers and practitioners act together in the context of an identified problem to discover and effect positive change within a mutually acceptable ethical framework

Teaching: refers to a deliberate course of action that involves planning, implementation, assessment and evaluation of instructional activities and experiences to ensure learning outcomes.

Learning: Jan van Rossum and Hamer (2010), connote that Learning is seen as using a way of thinking (a skill) to arrive at an informed view. Learning in this study refers to a holistic process of acquiring and developing new or existing knowledge, skills, attitudes, behaviours, understanding, values and wisdom which may occur as a result of experience, habituation or by conditioning and may occur consciously or unconsciously.

Skills: In this study skills refered to the capability of accomplishing something with precision and certainty and the ability to perform a function, acquired or learnt with practice.

Technical Drawing: Technical drawing, drafting or drawing, is the act and discipline of composing drawings that visually communicate how something functions or is constructed.

CHAPTER TWO: LITERATURE REVIEW

2.0 Overview

This chapter explores the theoretical framework that guides this study. This is also in relation to the concepts of how to improve Technical Drawing status in Seeta High school-main campus.

2.1 Theoretical and conceptual framework

The theoretical framework of this study is built on the main concepts that are considered and how they relate to each other. These concepts are categorized as independent, dependent and extraneous variable. The independent variable for this study included improving TD at Seeta High School, whereas the dependent variable was skills acquisition, extraneous variables on the other hand, were attitude, motivation and curriculum.

Conceptual model

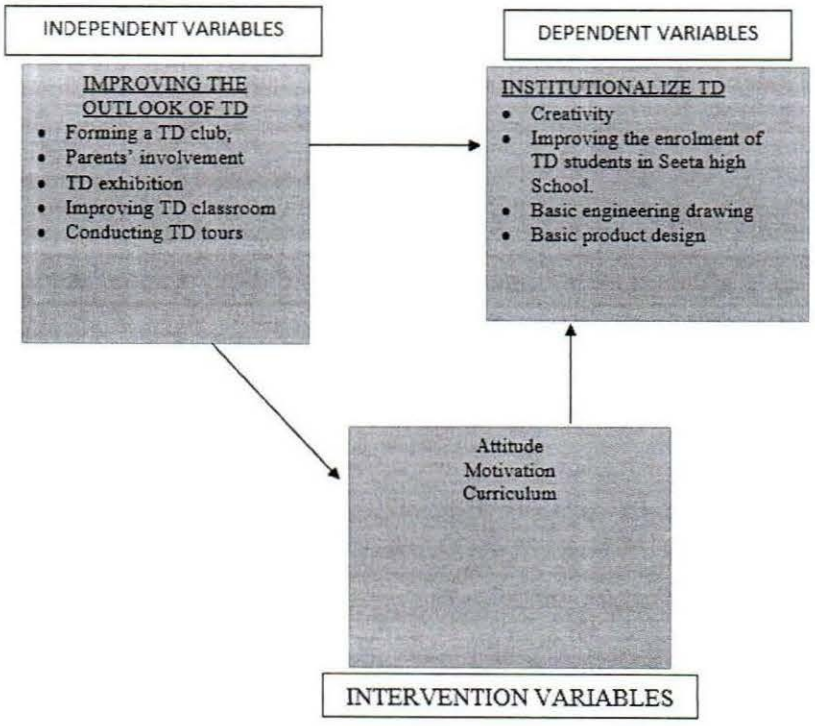


Figure 3: Showing a conceptual framework to this study

Source: Primary data, Seeta High School (2018)

The study draws from social marketing as a theory with a larger influence on the phenomena under study. Mainly in the business domain, social marketing as a theory is traced back in mid-20th century with works of a sociologist Walter Wymer (Wymer, 2011). (Wood, 2016) further expounded on social marketing within the marketing field. He further defines social marketing as the design, implementation, and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution, and marketing research. In recent times, social marketing theorists have broadened their concepts to also include in addition to commercial sector, non-profit sector, see (Andreasen, 2002). In the context of this study, the researcher explored the concept of social marketing to examine the status of TD as a subject in a teaching and learning institution, emphasizing what needs to be done in order to improve its status among other subjects. The researcher therefore based on different ideas highlighted in the social marketing theory such planning, designing, implementing and evaluating social campaigns with information sharing as its major objective, to develop strategies and implement them.

The researcher agrees with certain aspects of the theory, for example marketing as social course. The aspects of social marketing theory that emphasize marketing a social course and social change, was critical and thus emphasized in this study. Social marketing tries to understand social and psychological factors which bring resistance to change in society. It increases acceptability, response and practice of any social idea for target group. Techniques of marketing like market segmentation, exchange theory and consumer research are used extensively. Social intervention is the main objective of social marketing. In this study, a number of strategies were developed by stakeholders in order to improve the status of TD as a subject in Seeta High School – Main campus, which are examined below.

2.2 Implement strategies to improve the status of technical drawing

Basing on the discussions held between various stakeholders, a number of strategies were developed which are discussed under this section.

Forming a TD club; one of the strategies to improve on the enrolment of TD students in Seeta High School – Main campus, is to form a TD club. Clubs are considered as Extra-Curricular Activities (ECA) in schools. Extra-curricular activities (ECA) are activities that take place outside regular class teaching and learning and yet are related to student learning. As such, they fall within the scope of the school curriculum (Bartkus, 2012). Clubs act as ways for learners and teachers to get outside the classroom environment and share knowledge pertaining to innovations at hand and in this case sharing ways of how they can solve the challenge of low enrolment at Seeta High School main campus. Clubs tremendously facilitate students' creativity, critical thinking, problem solving by giving students an opportunity to spend time with their friends and do activities they find fun and interesting. This is shared by Nwankwo, (2015), who asserts that clubs are organizations based at a particular school and intended to provide opportunities for students to explore science. Nwankwo (2015), explores science clubs in particular, however, in the context of this study, the researcher explored clubs in the general sense and particularly a TD/Engineering club as a subject. Clubs offer students the opportunity to explore areas not covered by the curriculum and give the club members plenty of opportunities to practically study various areas.

Parents' involvement; involving the public, particularly parents in the school, was highlighted to be vital in an effort to improve the status of TD in Seeta High School – Main campus. Research has shown that involving parents in the school activities especially in educational areas tremendously improve students' performance and attitudes towards learning as is shared by (Hinkle, 2017; McNeal, 2014).

"...both students and schools benefit when parents are involved in education. Academic achievement and standardized test results are higher, students have a more positive attitude toward school and their behaviour is better. Other benefits include more successful academic programs and schools that are generally more effective..." (Hinkle, 2017).

TD exhibition: Technical Drawing exhibition was also identified as a good strategy to promote the subject in the school. Exhibitions are important avenues in which learners can showcase their ideas. Great Schools Partnership, 2014) holds that in education the term exhibition refers to projects, presentations, or products through which students exhibit what they have learned, usually as a way of demonstrating whether and to what extent they have achieved the expected learning objectives. An exhibition is typically both a learning experience in itself and a means of evaluating academic progress and achievement. In the context of the study, this acted as a great avenue for students and the teacher to display ideas in TD to further convey the significance and relevance of TD to students.

Improving TD classroom: Classroom environments are vital for students' ability to learn. When the learning environment "classroom", is conducive, it acts as an extrinsic motivation to learning. Students spend a lot of time in classrooms and as such require a rather supportive and conducive space to develop. This is shared in (Hannah, 2013) who holds that, With the classroom being such an important place in the growth of a child it is important to understand the ways in which to affect this environment in order to receive maximum effectiveness in instruction. (Hannah, 2013) further emphasizes that if schools really do play a large role in teaching the next generation how to be successful members of society then every precaution should be taken to make sure that the learning environment is one that helps students thrive.

Conducting TD tours: learning does not only start or end in a classroom. Field trips have been proven to be of great importance in enriching students' knowledge and investigation in regard to what they are studying. Field study is one of the outdoor education methods, which are rooted in fields such as philosophy, epistemology and naturalism (Vassala, 2006). Also referred to by some scholars as informal learning (Crane, 2003), field tours are one of the important aspects of a learning environment. According to Crane (2003), there is a growing body of evidence suggesting that students' behaviour and relationships with subject matter change or are influenced through hands-on experiences. It is therefore important to conduct field tours in an effort to expose students to TD aspects which will create an awareness on the importance of the subject to the world of work. Field trips are important in various ways. According to Jackson (2012), field trips help students to gain experience in integrating the theoretical perspectives learned in the classroom with experiences gained in the field; achieve insight into the workings of an organization; and become more conscious of the relationship of social roles, institutional dynamics, and larger cultural systems.

Forming a TD association in the school: Associations, like clubs, are important avenues of learning and exposure to students at various levels. Subject associations play a vital role in education. They offer conferences, workshops, newsletters and an array of learning resources. The associations publish journals, attend ministry meetings and provide teachers with news and information about the curriculum related to their subject areas.

CHAPTER THREE: METHODOLOGY

3.0 Overview

This chapter highlights the research design, study population, sampling method, data collection methods, tools and instruments used in the action research study.

3.1 Research design and approach

The researcher employed a participatory action research design and a qualitative approach as explained below:

3.1.1 Participatory Action Research design (PAR).

Participatory Action Research (PAR) approach was employed in this study. Selener (1997) as cited in Reason and Bradbury (2012, p.1) describes participatory research as a process through which members of an oppressed group or community identify a problem, collect and analyse information, and act upon the problem in order to find solutions and to promote social and political transformation.

Reflecting upon the aforementioned assertion by Selener, the researcher stress the coming together of people with a common life challenge and share ideas to develop a solution for their progress. However, my point of departure with Selener is that she does not clearly show the act of seeking for ideas from outside the troubled community, which in my view, is vital in any kind of research.

The method is unique because participants are regarded as experts due to their lived experiences related to the research topic, ensuring that relevant issues are being studied. According to Watters (2010), PAR combines two different approaches: participatory research and action research. Watters (2010) further contends that, participatory research encourages equal involvement of researchers and participants in the research process. When participants and researchers are equal partners, the research focus and results can be more relevant to a specific community. Participatory research typically involves selecting research issues related

to dependence, oppression, and other inequities in need of evaluation. In the same vein Watters (2010) contrast, action research and participatory research where the former uses findings to reveal strategies that can address community issues. Community needs are evaluated and action is taken with the purpose of social change through development of services and organizations.

It is the researcher's observation that through PAR, knowledge is collaboratively constructed for the benefit of the society since it is the major concern. This mode of knowledge construction is shared by (Gaventa, 2013) pointing out that participatory action research recognizes that knowledge is socially constructed and embedded, Thus research approaches that allow for social, group or collective analysis of life experiences of power and knowledge, are most appropriate. The range of approaches allowed in this type of research enticed me to undertake it in order to develop a wide knowledge base.

3.1.2 Qualitative approach.

This researcher employed a qualitative approach through the use of informal interviews, focus group discussions, observation, log books and documentary analysis as key methods of data collection. Qualitative approach of research is key in social sciences as reflected in University of Utah journal. University of Utah (2018) defines qualitative research as a process of naturalistic inquiry that seeks in-depth understanding of social phenomena within their natural setting (Merriam, 2015). It focuses on the "why" rather than the "what" of social phenomena and relies on the direct experiences of human beings as meaning-making agents in their everyday lives. Rather than by logical and statistical procedures, qualitative researchers use multiple systems of inquiry for the study of human phenomena including biography, case study, historical analysis, discourse analysis, ethnography, grounded theory and phenomenology. This therefore helped in cross checking information and relating it to the various sources.

3.2 Study Population

The participants in this study were 49 people comprising of 27 students offering TD, 10 Old Students from SHS who offered TD, 10 parents of students offering TD, and 2 administrators. The views from all participants were subjected to a critical discussion in the whole process of research.

3.3 Sampling method

The selection was random from volunteers in the school. However, the researcher employed a purposive sampling method within the random selection of stakeholders to TD as a subject. Purposeful sampling is widely used in qualitative research for the identification and selection of information-rich cases related to the phenomenon of interest (Leung, 2015).

Although there are several different purposeful sampling strategies, the researcher employed criterion sampling which is supported by (Lawrence, Palinkas, Jennifer & Wisdom, 2015). However, combining sampling strategies may be more appropriate to the aims of implementation research strategies and more consistent with recent developments in quantitative methods.

Purposive sampling method, helped in generating information from people that is valid, as they are using their experiences to reflect on the subject under study.

3.4 Methods of data collection

This study employed a number of methods to generate data. This study employed alternative methods of data collection as supported by Taylor-Powell and Steele (1996) who connote that alternative methods of data collection to traditional scientific ones, have gained recognition over the past decade. Accordingly, these methods seek to explore situations in depth in order to understand complex social conditions.

3.4.1 Observation.

The researcher employed observation as a method of data collection in order to record observable aspects in relation to challenges affecting teaching and learning of TD as a subject. Kawulich (2005) cites Marshall and Rossman (1989), who define observation as the systematic description of events, behaviours, and artifacts in the social setting chosen for study. Observations enable the researcher to describe existing situations using the five senses, providing a "written photograph" of the situation under study. This therefore implies that observation as a method of data collection can be a fundamental aspect of research by transforming aspects of social concern that would have otherwise escaped through other forms of data collection.

3.4.2 Focus Group Discussion (FGD).

Focus group discussion is a qualitative method of data collection where members of the group are encouraged to express views pertaining to the issues being studied. It is usually facilitated by a moderator and sometimes assisted by another individual writing the minutes. FGD is one way of gathering a group of people with common background or experience to discuss a common idea or ideas. Freitas (1998) refers to focus group as a type of in-depth interview accomplished in a group, whose meetings present characteristics defined with respect to the proposal, size, composition, and interview procedures. The researcher used FGD to obtain collective information from the various groups that formed the study population.

3.4.3 Document analysis.

Analysis of documents related to the study, is one way of obtaining relevant information to support finds and theories. Bowen (2009) defines document analysis as a systematic procedure for reviewing or evaluating documents – both printed and electronic (computer – based and Internet-transmitted) material. Like other analytical methods in

qualitative research, document analysis requires that data be examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge. The researcher analysed documents that were related to the topic of study to get scholarly backing.

Table 3: Performance of students and their O level Background in TD (2012 – 2016)

NAMES	SCORES	YEAR	OFFERED TD AT O'LEVEL
Tim	A	2012	NO
Juliet	B	2012	NO
Jesse	B	2012	YES
Ssemakula	B	2013	NO
Martin	B	2013	YES
Merlin	A	2013	YES
Bruce	A	2013	YES
Jenny	A	2013	NO
Nathan	A	2013	YES
Eric	C	2014	YES
Eugene	B	2014	YES
Bill	A	2016	YES
Alex	B	2016	NO
Salim	A	2016	YES
Gavin	B	2016	YES
Griffin	B	2016	YES
Bryans	A	2016	NO

3.4.4 Informal Interview.

Informal interviews in the researcher's view are random and voluntary discussions between individuals with the aim of generating information. The researcher employed this method of data collection to help in giving the participants less tension and anxiety in answering certain questions. To be specific this was given to students and administrators during the situation analysis period before the future workshop was conducted.

3.5 Data collection tools

Data collection tools that the researcher used in this research were, future workshops, video and audio recordings, photography through the use of cameras and logbooks.

3.5.1 Future workshop (FW).

A future workshop is one of the tools researchers use to generate critical information among participants. Some scholars refer to FW as a method like the case of Skoglind-Öhman (2015) who refers to the FW as a method developed by Robert Jungk from Germany. The method aims to support participants in identifying common problems, develop visions and ideas, and make an action plan (Skoglind-Öhman, 2015). Therefore, the researcher used the FW as a tool to generate information from research participants. Future Workshop contains five phases; preparation, critical, fantasy, reality and implementation.

Preparation phase: During this phase, the researcher prepared school computer Laboratory as the venue to be used, the materials such as flip charts, markers and tools such as projectors and put in a conducive environment for the discussion to take place. This was done in advance before the meeting to have everything set for the smooth running of the meeting. This phase also included informing participants on what they were expected to do, read the rules of the discussion and inform them the theme under discussion these included the following values to mention but a few. Dialogue – Discussion to resolve a problem, Transparency – Open and honest, Equity – Fair and Impartial and Democracy – Majority take

the day. According to Skoglind-Öhman (2015), the workshop theme must be challenging and distinct. This first phase contains practical tasks such as providing information to workshop participants on the FW and how it will be conducted, time allocated for various phases, facilitators role, etcetera.

Critical Phase: In this phase, which is mostly referred to as the beginning or opening of the workshop, (Skoglind-Öhman, 2015, p. 121), challenges or problems in relation to the workshop theme (How Best can we close the Gap in order to produce students with better grades based on the data presented?) , are highlighted by participants as; having few teachers of TD in the country, too much content to be covered in the smallest time of two years, absence of TD at O'level in SHS, attitude, lack of career guidance, minimal facilitation from management, awareness need modes of teaching and delivery of TD. A problem list based on the participants' submissions was developed and displayed for everyone to see. The discussion here and throughout the workshop is democratic, concrete and objective as participants drew from their experiences about the subject matter under study.

Fantasy phase: According to Heino (2004), fantasy phase is the point to alienate a problem solution and to present it in 'false', 'untypical' and not strictly rational forms. In this phase, participants were encouraged to; (while forgetting all the financial, personnel, technical and organisational restrictions), give their ideal situations, dream what they would have loved to have in place. This generated quite a number of ideas which aimed at improving the situation such as; recruiting more TD teachers, starting TD in either S.3 or S1 the next term, organising TD exhibition, forming TD club and forming a TD association to mention but a few.

Reality phase: In this phase, the ideas brought forth by participants in the fantasy phase were concretised to form an action plan and this was done by clustering forming only three basic ideas that's to say; Career Guidance, Seeta High school Management and the TD

class. This is supported by Skoglind-Öhman (2015) who holds that the aim of this phase is to go through all fantasies trying to find the hindering factors. Critiques and visions are connected into concrete action plans. In this phase participants document clear missions with information about the "who", "what", "when" and "how" of reaching the goal, for instance, which action plans should be adopted and what resources are needed for various actions?

Implementation phase: The final phase in the FW is implementation phase. Sometimes referred to as the action phase, it emphasizes drawing a plan to follow in the implementation of activities agreed upon in the reality phase. During the workshop, a timetable was designed highlighting the activities, responsible person, timeframe, process to be followed and indicators that the activity has been accomplished as per the time schedule with in which the research must be completed.

3.5.2 Video, audio recording and photography.

Video and audio recordings were used to help in cross-examining the data generated through discussions. In the same way, photographs of events were taken and recorded for purposes of evidence of participation in the action research process. According to Pawar (2013) the use of audio-visual data in qualitative research as written data could be difficult to justify the emotional aspects of human nature. "Visuals give the essence of realty" (Pawar, 2013, p.1)

3.5.3 Log Book.

A log book was used by the researcher to record the processes of the research as a measure to have reference for information on the research. According to Powell and Steele (1996) a log is a record of chronological entries which are usually brief and factual. This is an important instrument in research as to keeps references and activity findings that would otherwise escape the mind.

3.6 Data collection procedure

Introduction letters was obtained from NOMA administration and delivered to the Seeta High School – Main campus. Permission to collect data within the school, was sought through request letters. Meeting schedules and appointments were agreed upon with relevant stakeholders for various dates. Schedule for future workshops was developed and agreed upon by all stakeholders. Future workshop was conducted basing on the situation analysis as a starting point. Focus group discussions were used to generate data from different stakeholders. Implementation of suggested strategies were conducted with participation of stakeholders where findings were generated and recorded. Document analysis was used and the different graphs and tabulations were generated from the information given by the stakeholders (Seeta High School). The researcher and the former students of Seeta High School held informal discussions and this led to further in depth discussions in the Future Workshop which was held on the 10th March 2018. A number of teachers that participated in the discussions they gave me their word about their full commitment to the research I have done

3.7 Data analysis

Data analysis presents statistical and logical techniques which were used to; illustrate, compare, evaluate, describe data collected. Data collected was analysed under each research objectives. Graphs, figures, tables and charts were used to present data. The data collected was analysed descriptively since it was qualitative in nature.

3.8 Ethical Considerations

An introductory letter from the administration at NOMA was obtained by the researcher (see Appendix A) and delivered to the administration Seeta High School – Main campus. The researcher observed democratic participation of all stakeholders without

coercion and the researcher communicated to participants that their contributions were treated with high integrity.

3.9 Validity and reliability of data

To ensure valid and reliable data, the researcher ensured that the tools used to collect data were subjected to a thorough and rigorous process to ascertain whether they will collect relevant data related to the study. Further still, the researcher triangulated data collected from various sources to determine similarities and differences to make findings more reliable.

CHAPTER FOUR: PRESENTATION, ANALYSIS, AND EVALUATION OF FINDINGS

4.0 Introduction

This chapter reviews, presents and interprets the data obtained from the field and well thought-out as relevant to improving Technical Drawing as a subject in Seeta high school, in Mukono District. The presentation and interpretation based on the objectives of the study as reflected in chapter one namely to; Develop strategies to improve Technical Drawing as a subject in Seeta High School, in Mukono District; Implement strategies to improve Technical Drawing as a subject in Seeta High School, in Mukono District; Evaluate the impact of implemented strategies aimed at improving Technical Drawing as a subject in Seeta High School, in Mukono District.

Furthermore, the presentation illustrates a reflection of a story of action as it unfolded, the researcher's learning experiences as well as those of the participants while undertaking the study.

4.1 Implementation of the identified strategies to improve Technical Drawing as a subject at Seeta High School, in Mukono District

4.1.1 Forming a TD/Engineering club.

Clubs are a great way for students to participate in activities they enjoy, learn new skills, and meet new people. High school clubs can cover a wide variety of topics, from technical Drawing to protecting the environment and more. Club meetings are usually held after school. Some clubs meet regularly and require a large time commitment while others meet once a month or less. Each club usually has a teacher or staff member who acts as supervisor or club patron. Students can also hold leadership positions in the club, such as president, vice-president, and secretary.

During the formation of the Engineering club in Seeta high school students were mobilised by the committee which was instituted comprising of the President, the Vice president and the secretary of the club. The club has made technical drawing more known than before through the activities like advocating for keeping Seeta high school green. No trespassing on the lawn and keeping Seeta high school rubbish free. The club has furthermore created TD corner in every stream of S1 and S2. These corners are filled up with engineering/TD articles which keep the students with the knowledge that TD is still existing in the school and through it one can achieve his or her goals in life.

4.1.2 Parents' involvement.

Gwija (2016) asserts that the role of parents in their children's education presents significant evidence in schools' academic results, when parental roles in education are given priority. It is noted that parents play a significant role in improving a school's academic results. Parents serve as a major influence in their children's career development and career decision- making. Parents want their children to find happiness and success in life and one factor which influences happiness and success is career choice. Research also indicates that when students feel supported and loved by their parents, they have more confidence in their own ability to research careers and to choose a career that would be interesting and exciting. This is important because studies show that adolescents who feel competent regarding career decision-making, tend to make more satisfying career choices later in life. From the above observations the participants deemed it necessary to involve the parents during school parents' meetings to emphasize on the existence of Technical Drawing in the school. This helped in advising parents to support the students currently doing the subject in the preparation of the exhibition by supplying the materials. This also helped to encourage parents to facilitate students with resources needed for a successful trip which was held on 5th July 2018.

Figure 4: Parents and students attending a careers meeting at school

Source: Primary data, Seeta High School main hall (2018)

4.1.3 TD exhibition.

In education, the term exhibition refers to projects, presentations, or products through which students "**exhibit**" what they have learned, usually as a way of demonstrating whether and to what degree they have achieved expected learning standards or learning objectives. Exhibitions are typically designed to encourage students to think critically, solve challenging problems, and develop skills such as oral communication, public speaking, research, teamwork, planning, self-sufficiency, goal setting, or technological and online literacy that is to say, skills that would help them prepare for college, modern careers, and adult life.

Exhibitions are interdisciplinary, in the sense that they require students to apply skills or investigate issues across many different subject areas or domains of knowledge. Exhibitions may also encourage students to connect their projects to community issues or problems, or to integrate outside-of-school learning experiences, including activities such as

interviews, scientific observations, or internships. The researcher observed that students were very open to the fact that they carried out the exhibition as an intervention strategy so as to improve on the current status of TD in Seeta high school as illustrated in Figure 6.

Figure 5: Students with their prototypes to be exhibited for parents to see.

Source: Primary data, Seeta High School TD classroom (2018)

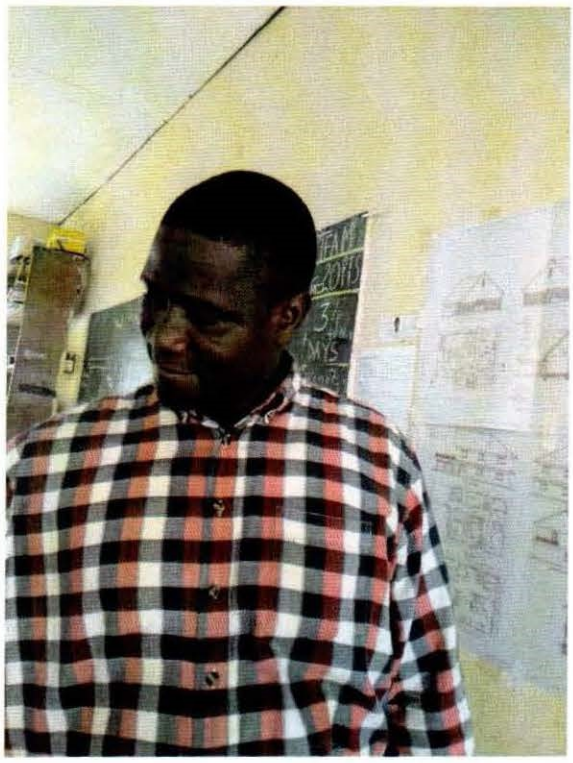


Figure 6: Parent checking out the prototypes exhibited

Source: Primary data, Seeta High School (2018)

4.3.4 Improving TD classroom.

Sometimes we get caught up in the intricacies of instructional design or the bells and whistles of training Technical Drawing and forget about the learners' needs and the end result the subject should achieve. In light of that, this section presents the ways in which the learning environment (TD class), was improved considering it had been neglected for a long time. A class coordinator was elected through democratic means and he helped in maintaining the cleanliness of the room where he drafted a sweeping schedule to ensure the room is kept clean at all times.

The exhibition models were put in a corner for all students to view at any opportune time. Traces of house plans were displayed on the walls of the TD classroom for the students of the previous years and current years as an encouragement to new students that it is very possible to also produce the same exact work and even better.

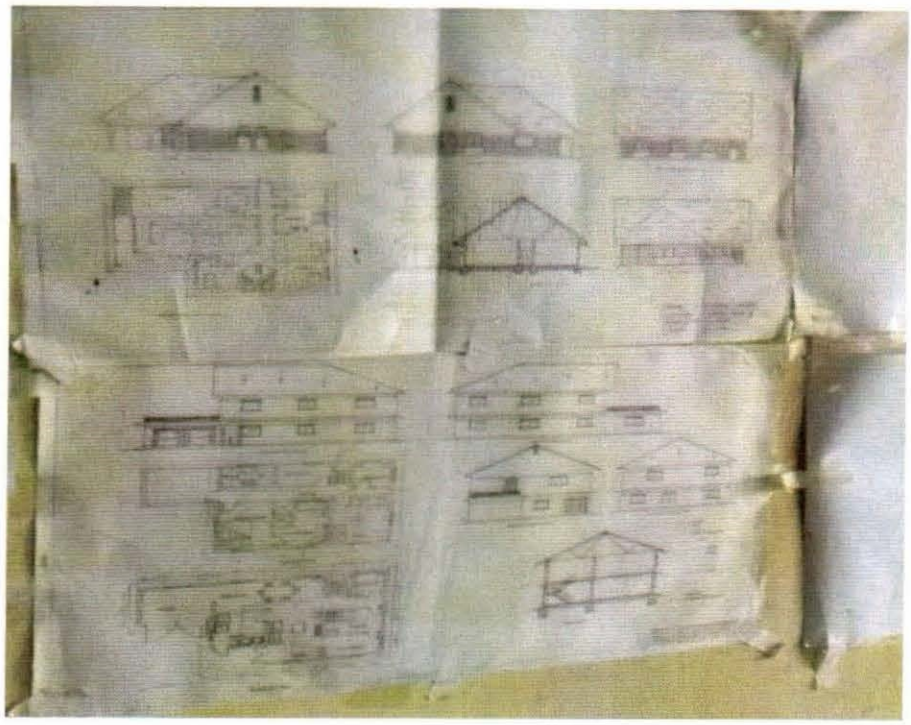


Figure 7: Some of the plans which were pinned in the TD room

Source: Primary data, Seeta High School TD classroom (2018)

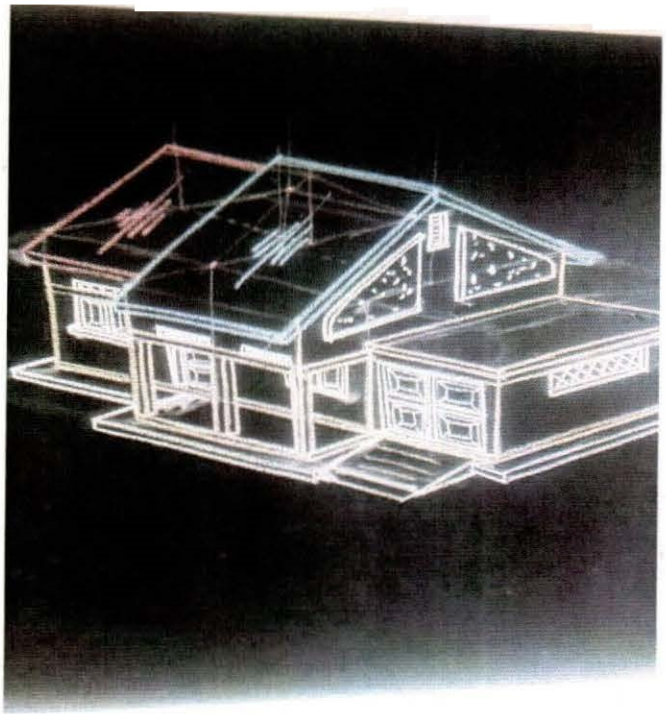


Figure 8: Some of the pictorials TD students displayed.

Source: Primary data, Seeta High School TD classroom (2018)

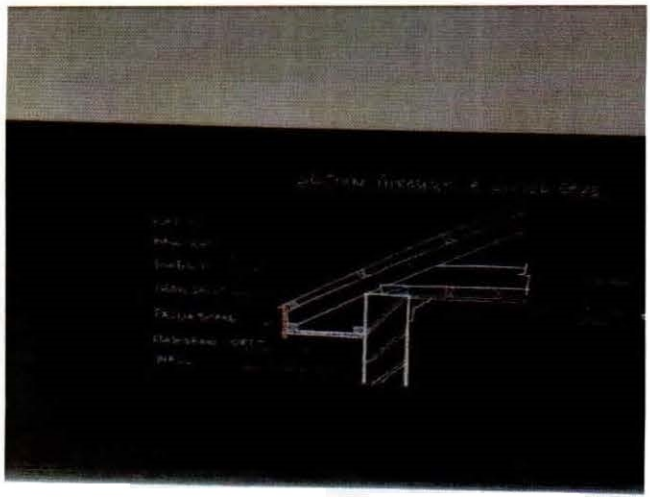


Figure 9: Some of the pictorials TD students displayed.

Source: Primary data, Seeta High School TD classroom (2018)

4.3.5 Conducting TD tours.

A field tour is one of the many ways learners can experience the effect or importance of TD in the world of work other than just the theory work in class. This was realized on the 5th of July 2018 where students visited sites like; Plascon which is one of the leading paint producing companies in Uganda is located in Namanve business industrial park. The second company we visited was the Uganda Industrial Research Institute (UIRI) where learners were exposed to the different technologies and how they can use their environment to solve the different problems at hand.

Students also visited Roofing Uganda Limited (see Figure 10) as one of the companies and students were exposed to the different designs of roofing materials how the

different departments execute their duties and how they beat the various deadlines for the specific projects ahead of time.

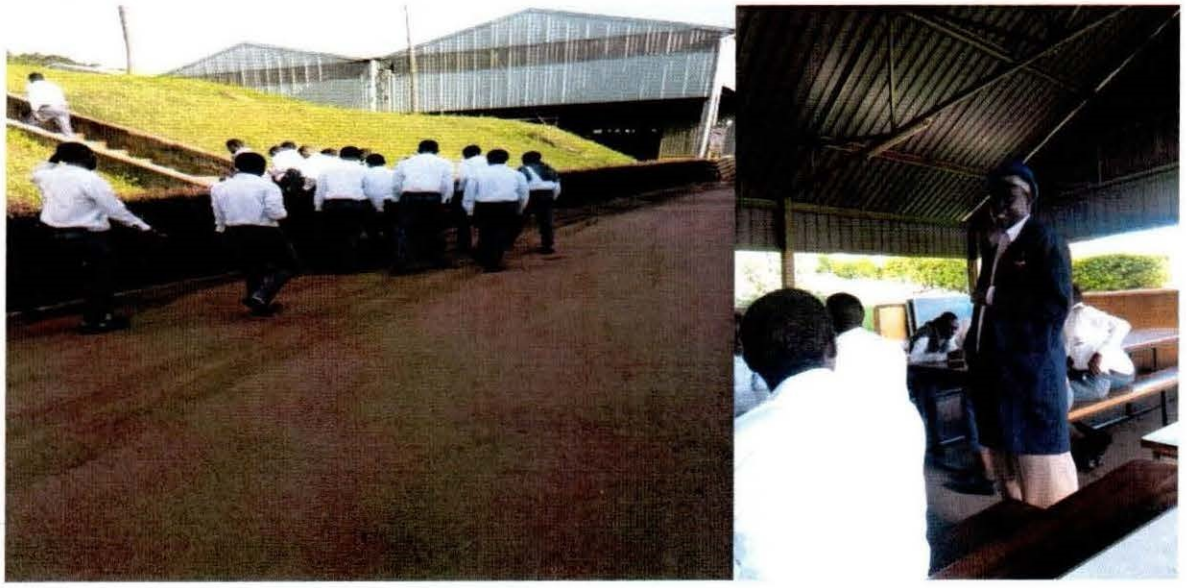


Figure 10: A tour guide talking to the students after the tour around the company premises.

Source: Primary data, Students' visit to Roofing Uganda Limited (2018)

RRM

The Head Teacher,
Seeta High School,
P. O. BOX 417
Mukono, Uganda

Monday, June 11, 2018

Dear Sir,

RE: REQUEST FOR A STUDY TOUR OF OUR NAMANVE PLANT

The above matter refers.

Ms. Roofings Rolling Mills Limited is in receipt of an official letter from your end requesting for a Study Visit at our premises located in Kampala Industrial Business Park – Namanve. **A copy of our study tour policy is enclosed for your kind perusal and consideration.**

To that end, we are pleased to inform you that RRM Management agrees to your request and has accordingly granted the Study Tour to be conducted on **Friday 6th July, 2018** starting at **2:00pm.**

Lastly, the expected number of visiting students including their instructors / course facilitators must **not** exceed **Sixty Five (65).**

For Ms. Roofings Rolling Mills Limited,

SHEIKH ARIF
DIRECTOR – TECHNICAL

CC: HUMAN RESOURCE MANAGER
CC: RRM PLANT MANAGERS

ROOFINGS ROLLING MILLS LTD.
(STEEL ROLLINGS)
Plot 406 Kampala Industrial Business Park • Namanve • P.O. Box 35086• Kampala
Uganda Telephone (+256)039-2-700952 • Telefax (+256)039-2-254952
rrm@roofings.co.ug • www.rrm.co.ug

Figure 11: A letter of acceptance to have a study tour at Roofings.

Source: Primary data, Roofing Uganda Limited (2018)

4.4 Evaluation of the identified strategies

This section sought to evaluate strategies directed towards improving the status of technical drawing as a subject at Seeta High School – main campus. At the end of the project we gathered as stakeholders and looked at the project as an entity and later moved from one unit to another. The aim was to critically reflect on the individual activities and deduce any experiences so far learned. The process also aimed at ascertaining whether or not the set objectives, were achieved.

4.4.1 Formulation of TD/Engineering club.

Joining clubs and taking part in extracurricular activities helps you learn to work in groups, develop leadership skills, and allows you to learn from other students. "As an engineering student, you have many opportunities to indulge your passions and discover new areas of interest. Whether you end up in student governance or designing and building as one of our student vehicle projects, the time you invest in finding the group that's right for you is well worth it." Engineering (2018) entirely agree with the college of engineering Dean University of Alberta who asserts that one should join a club with passion and this was exhibited during the formation of the engineering club at Seeta high School.

To the researcher's amazement he could not fathom the fact that some of the current students doing TD at A 'level were not part of the club, since some just ended up doing the subject not voluntary others feared the demands the club could weigh down their academic performance. In third term the club held only one meeting brainstorming on the different activities they are to execute the coming year 2020. The reason as to why they did this was because of the different academic programmes at the school then. On the other hand, however a committee was set up to lead the club and the first intervention strategy was to set up an engineering/science corner in every stream of S1 and S2 where different articles of the great

scientists were pinned in the different streams. The club also managed to attract old science students of the school to share their journey in the world of work.

Some of the challenges registered during the implementation of the club were that some students who were part of the club had other clubs they belonged to such as; interact and computer clubs. This restrained the meetings and activities from starting off. The positive registered from the formulation of the club new ideas were shared which were not limited from any student of any level. The administration was also very supportive in the sense that the head teacher Mr. Albundi Paul, was personally involved in some of the activities. In one of his many supportive statements, he said "...anything that adds value to this school you have my full support..." (10/02/2018).

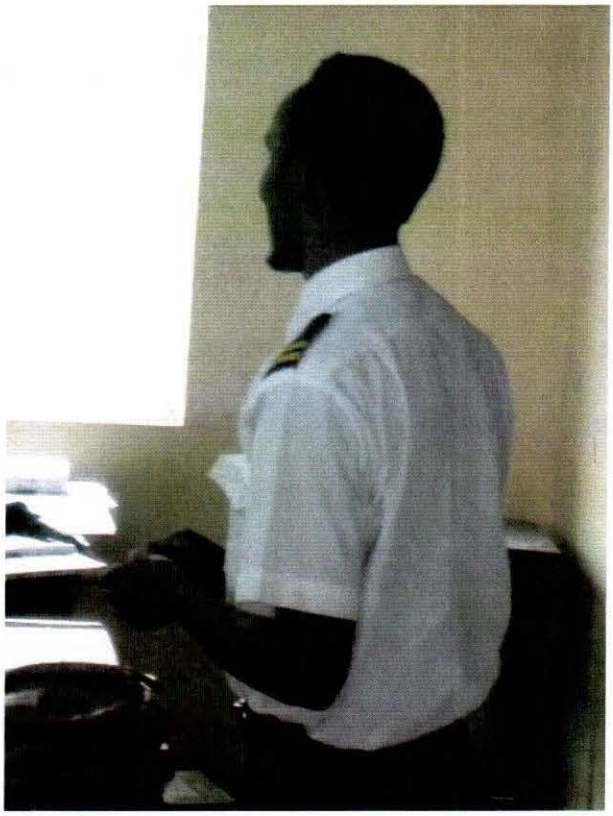


Figure 12: An Old student sharing about the aviation world of work.

Source: Primary data, Seeta High School (2018)

4.4.2 Parents' involvement.

Parents serve as a major influence in their children's career development and career decision- making. Parents want their children to find happiness and success in life and one factor which influences happiness and success is career choice. Research also indicates that when students feel supported and loved by their parents, they have more confidence in their own ability to research careers and to choose a career that would be interesting and exciting. I would like to affirm that the parents were very supportive in this activity by providing funds to the students to get involved in the study tour. Additionally they provided most of the materials for the formation of the building models which were used during the exhibitions.

4.4.3 TD Exhibition.

Science exhibitions are really great opportunities for students as well as teachers to disseminate knowledge that they have, and to experience a variety of new inventions and innovations that also need wide dissemination. The great significance of exhibition is that it fosters acquisition of different process skills leading to the development of multiple faculties of intelligence in a social context. In such a point of view, it shares very strong theoretical bases of Scientific Attitude, Multiple intelligence, and Social Constructivism. The main theme of the exhibition was to create awareness of TD as a science subject in Seeta High School.

Thorough analysis of the TD science exhibition of SHS was conducted, so as to realize its prospects and problems. The Exhibits include building models and house plans done by the TD students at school. The exhibitors had to be awarded marks for the different exhibits which contributed to the Middle of term assessments and this prompted them to prepare very well for the project. However, students had challenges with funds to purchase the materials since some parents were not cooperative, Parents appreciated the work done by their sons and daughters because they were in amazement with what they saw. The overall winning model,

the second and third were all presented to the Head teacher and they are displayed on the administration block and this was a success because every parent almost will inquire about those models.

Figure 13: The student with the best model presenting it to the head teacher.

Source: Primary data, Seeta High School (2018)

Figure 14: The 1st runners up student presenting his model to the head teacher

Source: Primary data, Seeta High School (2018)

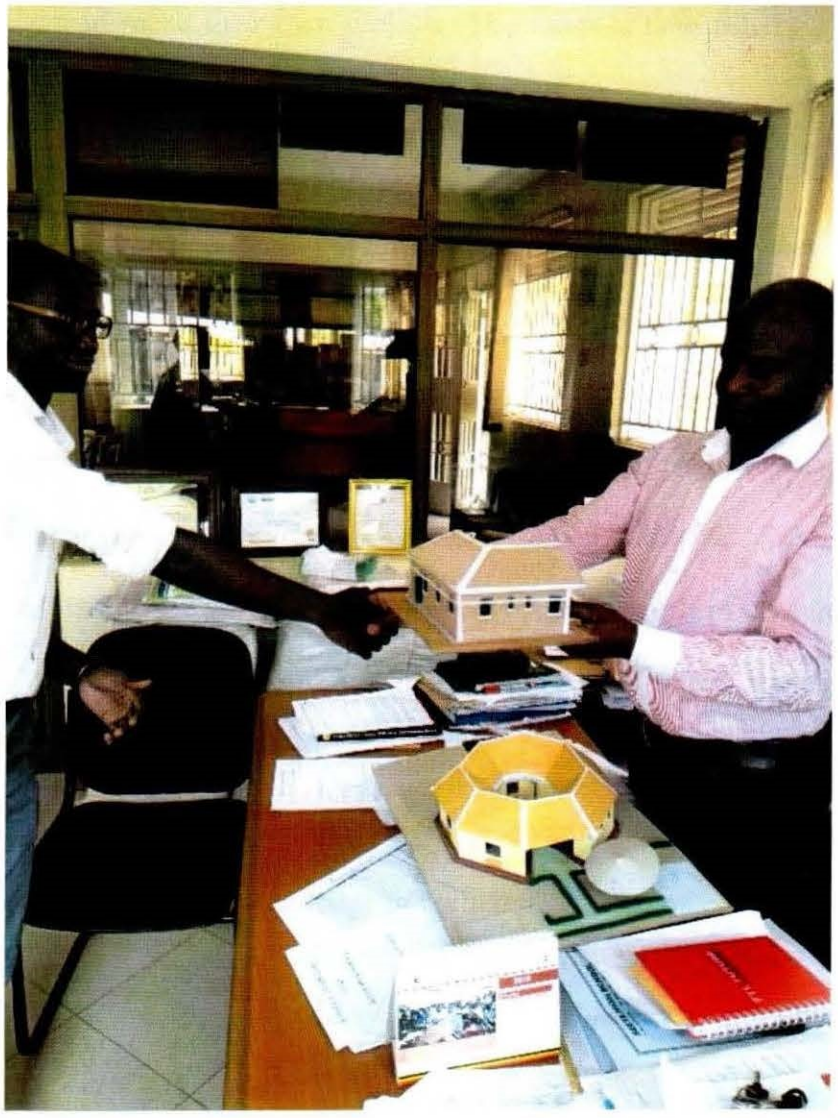


Figure 15: The 1st runners up student presenting his model to the head teacher.

Source: Primary data, Seeta High School (2018)

4.4.4 Improving the TD room.

Following the face lift given to the TD room there is ultimate order than before because a leadership committee was instituted where a class coordinator set up departments responsible for the safety of the projects at hand and the general cleanliness of the room. The learning environment is more conducive compared to how it was before learner's drawing projects are safe. Students have been inspired by the fact that they are seeing pieces their fellow friends presented and it has developed a sense of belief that students think of designs

from around them to make their own projects. The room is now filled by prototypes and house plans of the students in previous years.

4.4.5 Conducting the TD tour.

Students had a great time on a trip to factories like Plascon, where learners learnt about the different types of paint and how they are manufactured. Later, we saw how the containers are made with in the factory. This was an enriching experience with good exposing atmosphere which enhanced learning. The second company we visited was Uganda industrial research institute where learners were exposed on how to add value to the different products around them so the trip was not only inspiring them towards being good entrepreneurs. We ended with a trip at roofings rolling mills where learners saw how the production of iron sheets, nails and barbed wire, were made through the different production processes. Even though the trip to roofings was a success, attempts to further visit Uganda Clays – Kajjnsi, were met with a challenge of limited time.

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 Overview

In this chapter, the researcher presents the discussion, conclusions and recommendations of the findings under the three objectives that were a foundation of this study. The objectives in question were; to develop strategies to improve Technical Drawing as a subject in Seeta High School in Mukono District, to implement strategies to improve on the status of technical drawing as a subject in Seeta High School – main campus, to evaluate the impact of implemented strategies aimed at improving on the status of technical drawing as a subject in Seeta High School – main campus.

5.1 Discussion

5.1.1 Developing strategies for improving Technical Drawing as a subject in Seeta High School in Mukono District.

Following the situation analysis conducted before the future workshop, the performance of students in TD improved over the years because the average grade was always B-5 points. In Seeta high school TD is offered at only Advanced Level since 2011. Table 4, with grade of results considered by UNEB at Uganda Advanced Certificate of Education (UACE).

Table 4: Ranking of students for Advanced Level by UNEB

SCORE	POINTS
A	6
B	5
C	4
D	3
E	2
O	1
F	0

From the situation analysis it was also noted that the number of the candidates who sat for their Uganda Advanced Certificate of Education (UACE) examinations since 2012, has been low. They ranged from 3 to 10 for different years, as illustrated in the table 5.

Table 5: Students who sat for their Exams at UACE (2012-2017)

Enrolment of A level TD class (2012-2017)			
YEAR	From another school in O'level	From SHS in O'level	Total
2012	6	1	7
2013	8	1	9
2014	8	2	10
2015	2	1	3
2016	6	1	7
2017	6	2	8

The above statistics highlighted a great gap in both enrolment numbers and the fact that most of these students came from the various schools from 'O' level not necessarily Seeta high school. This means that Seta high school had no significant influence on the students' subject choices in regard to TD. Moreover those who took up the subject were lacking prior basic knowledge from lower levels of learning. On the other hand, it is not surprising that the majority of the students who took up TD at Seeta high school, came from other schools. This is because almost all of them would have been exposed to the subject by their respective schools, highlighting its importance especially to those students intending to have engineering as a career pathway. From different interviews and discussions with different TD students, it was evident that students have little say in their subject choices.

Most of the decisions on choosing which subject one does, was evidently done by parents and teachers or school administrators. It is from this background that the strategies to improve the status of TD at Seeta high school, were developed. In this section, I discuss the findings from the implemented strategies.

Information that we were ushered into a future workshop by the facilitator such that we find a lasting solution to the different challenges that could have surmounted to this gap. The future workshop had to answer the critical Question at hand then.

Critical question

How can we close the gap in order to produce students with better grades based on the data presented?

Brainstorming

Career guidance. (ST), Administrators should listen to the opinions of the students. (ST), Scarcity of TD Teachers (*Employ more TD teachers*). (LT), few schools are teaching TD. (ST), Have professions come for career guidance. (ST), Invite former students for career guidance. (ST), Consider subject combination, Benchmarking, TD should be introduced in S.1, Make TD subsidiary for those intending to do engineering courses, Introduce TD in S.3 and S.4, and there is shortage of manpower.

Above were the suggested solutions to the challenge presented and we Identified the short term and long term however, we dwelt more on what can be achieved in the short term and we clustered them and subjected them to a pairwise matrix which identified the pressing need as awareness which has not yet been done well by the TD class.

The Clustered themes were; Career guidance, Management, and TD Class

The most pressing need was creating awareness of TD as a subject in SHS through the following interventions; Forming a club, involving parents, Doing exhibitions, Improving on the TD Room, and Tours. This was based on the first objective that required as to develop

strategies that will improve on the status of TD in Seeta High School. The researcher learnt that where there is a will there's a way because the term with in which I carried out the future workshop it had various activities running concurrently however, the learners, administrators and the old students of Seeta High School participated ably.

5.1.2 Implement and evaluate strategies to improve Technical Drawing as a subject in Seeta High School, in Mukono District.

Starting a TD/Engineering club; In relation to starting up a TD/Engineering club, as an implementation strategy, students managed to start up a science club with the above name. During this intervention, students managed to demonstrate leadership skills since the club has a leadership structure, relational skills where students manage to relate with each other and of different levels since the mobilisation was done throughout the whole school. However, some of the projects were not realised since the term had different activities to embark on, other than the club activities.

Field Tour; During this implementation strategy learners turned up for the trip however, some companies which interlink the theoretical aspects to the Practical aspects like Kajjansi clays limited were under renovation so we were denied access but on the other hand Roofings, Plascon paints and UIRI gave us permission to visit and carry out a study tour at their premises. A lot is out there to be learnt and to relate with, however, time constraints between companies was a challenge and students suggested to have at least two study trips in a year which will be effected next year if the Board passes it.

Experiences that occur outside the classroom and another key researcher into the area of field trips, proposed that field trips should be weaved into the teaching schedule as this will provide an opportunity for students to view information for themselves and use their own senses to touch, or feel materials that they had previously only heard about (Patrick, 2010). This immediacy and accessibility is a key feature of field trips and one of

its redeeming features. Leaving the school premises is a social experience and one, which provides a change of tempo and scenery for students

Parents' involvement;

Parental involvement in school is defined as parent-reported participation at least once during the school year attending a general school meeting, scheduled parent-teacher conference, and school or class event; or volunteering in the school. (Stark, 2013). From this strategy the researcher would like to applaud the role of parents in the academic life of their children since they were very instrumental in guiding S.4 learners on the different combination to take up come 2019. Those in other classes were supported financially in taking up the study activities done by the club.

However, parents have demoralised learners from taking up TD since it requires materials which they cannot sustain over the spell of time (2 years) unlike in other subjects like Economics with less demand.

Exhibition; during these intervention strategy students learnt how to exhibit their projects and to produce prototypes from the materials around them and their environment. The exhibition room was very small because that is what the school administration advised us to use and this was a big limiting factor for most of the learners since some parents did not have enough time to move around to check on the different projects in the school.

Improving on the TD room; Having a talking class is one of the principles advocated for to enhance Active teaching and Learning and from this principle the stakeholders advocated for this however, the school administration was not in agreement to us painting the room since it was already contracted by a specified company. This was a limiting factor however, we maneuverer around it by displaying work of the students to cover up all the plain walls and the displaying of the prototypes from the exhibition.

5.2 Conclusion

The study sought to improve Technical Drawing as a subject in Seeta high school, Mukono District. The researcher held this as a motivating factor towards students' learning, performance and enrolment. A number of strategies to improve TD in Seeta High School, were developed, implemented and evaluated. To a bigger extent, students and administrators were motivated during and after implementation of these strategies. However, even though students, parents and administrators have seen a great impact of TD in the school it has not yet settled well with parents to believe that their children can do technical drawing in A Level even when they missed doing it in O level. Also, there is evidence of lack of a proper policy that students should carry out exhibitions in their science disciplines and the current head teacher could not commit to introducing TD in lower classes since it would necessitate recruitment of more man power which is not a current priority of the Board of governors. "having seen my friends in S6 and S5 make such prototypes it is evident that I can also do the same next year since I am finishing my S4 class this year 2018" by one of the students. This was evidence that students had seen a great impact of TD to the current status of the school.

6.0 Recommendations

The school administration should embrace more VET subjects like Agriculture, Foods and Nutrition and improve on the number of staff members who teach these subjects such that the psychomotor Domain is catered for in the school curriculum.

Technical drawing should be started in 'O' level to allow every student be examined of their capabilities in the subject before they change and opt for other subjects like Christian Religious Education, Commerce and Accounts. The best students with the best grades in technical subjects should be given scholarships. Technical Drawing should be introduced in the other campuses of Seeta high school like Seeta High Green campus, Seeta High Mukono campus.

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APPENDICES

Appendix A: Authorization letter to carry out research

KYAMBOGO UNIVERSITY

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FACULTY OF VOCATIONAL STUDIES

DEPARTMENT OF ART & INDUSTRIAL DESIGN

Masters in Vocational Pedagogy Programme

3rd November, 2017

SEETA HIGH SCHOOL
MUKONO DISTRICT.

SEETA HIGH SCHOOL
03 NOV 2017
P.O. BOX 30162 KAMPALA

Dear Sir/Madam,

RE: INTRODUCTION OF GUMA LAWRENCE.

This comes to introduce to you **Guma** Lawrence a student of Masters in Vocational Pedagogy (MVP) Programme at Kyambogo University. This student bears registration number no.16/U/14009.GMVP/PE and his in his final year. As requirement for graduation, this student is expected to carry out Action Research through a collaborative process with World of Work.

Any support rendered to him is highly appreciated.

Looking forward for your support.

Yours Sincerely

PP Mr. Chris Serwaniko

Coordinator, masters in vocational pedagogy

NORHED MVP PROJECT

Cc.Dean Faculty of Vocational Studies

Cc.H.O.D, Art and Industrial Design

Appendix B: Pairwise matrix

Clustered challenges

4. Career guidance
5. Management
6. TD Class

PAIR WISE RANKING

	1	2	3	Total	Ranking
1		14	1	15	2
2	3		10	13	3
3	16	7		23	1

Appendix C: A work plan for the road map to improve TD as a subject in Seeta high school.

Number	**Process**	**Person responsible**	**DURATION**	**INDICATOR**
1	Registering Elect board members Creating awareness Club constitution	Students Subject teacher Old students	1 month (15th. 04.2108)	• Constitution • Talking compound • Certificate of registration • Club literature • Registered Club members and executive
2	Make brochures Issuing the brochures Presentation on career day	Subject teacher TD club(students) Management	1 month (March – April 2018)	• Sample of brochure • Content shared in meeting • Agenda
3	Training on making models Exhibition of the models Procuring of the models Make models	Management Teacher Students Club members	2 month (March-May 2018)	• Displays • Talking TD room
4	Cleaning Making displays	Management Teacher	2 months(March-May 2018)	• Reports • photocopy

	Displaying Procuring materials	Students Club members		
5	reconniances	Management Teacher Students	1 month (March-mid-April 2018)	• Report • photocopy
6	Register Executive Constitution Create awareness	Old students Subject teachers Management	July 2018	• Registration form