

**STRENGTHENING STUDENTS' ENGAGEMENT TO LEARN PRACTICAL  
SKILLS: A CASE STUDY OF KIWOKO MEDICAL LABORATORY  
TRAINING SCHOOL IN NAKASEKE DISTRICT**

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**A DISSERTATION SUBMITTED TO THE BOARD OF EXAMINERS IN PARTIAL  
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**DECLARATION**

I, the undersigned do hereby declare that this action research thesis submitted is my original work and has not been presented to any institution.

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**APPROVAL**

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## DEDICATION

This research thesis is dedicated to my wife 'Mrs. Edith Nkurikiyimana', Son 'Victor Steth Rukundorwimana' and Daughter 'Mercy Steth Nyiramutuzo' for their patience while I was at university for 2years.

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**LIST OF ACRONYMS & ABBREVIATIONS**

CBT	:	Competence-Based Training
CME	:	Council for Medical Education
KMLTS	:	Kiwoko Medical laboratory Training school
KYU	:	Kyambogo University
LAB	:	Laboratory
MVP	:	Masters in Vocational pedagogy
TVET	:	Technical Vocational education and Training
VET	:	Vocational Education and Training

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## ABSTRACT

With exposure to different learning styles more especially on hands and expedition in the world of work during my training created in me a desire to analyze work processes for Kiwoko medical laboratory students towards competence acquisition. The study objectives were: to identify intervention to strengthen students engagement to learn practicals, to implement interventions and to evaluate the impact of interventions that enhanced students' engagement to learn practical skills. This research project was voluntary and participatory among 50 stakeholders of a medical laboratory training school. The qualitative data was collected using interviews, participant observation, photography and documentary analysis techniques with the help of a future workshop tool. The initial phase encompassed seeking entry permission into the research field. A situational analysis in which stakeholders and the researcher identified challenges faced by students during skills acquisition was undertaken. The interaction meeting with participants unveiled the following challenges; Much time spent in theory, congestion at practicum sites, procedures taught in the classroom not matching with those in the world of work, Less practical demonstration by tutors, poor students effective self-study, no exposure to HIV counseling, inventory, and store management skills. The stakeholders intervention to mitigate the challenges were; Enhancing practical return demonstrations, Scheduling time for students possible self- study, Attaching students in pharmacy and records for inventory and store management respectively, allocating specific period for theories and practical in the teaching timetable, providing pre and post-HIV counselling skills and reducing actual practices at hospital from 5 to 4 shifts. The evaluation of intervention implemented was based on student's responses, teachers' comments, and photography. Teachers agreed to demonstrate medical laboratory practical's for two weeks each semester, there is students group study for practical lesson from 9-11 am, students have an oral presentation of night and evening attachments reports, KMLTS signed and MOU practicum site attachment with Kiboga Hospital agreed to have, external hospital attachment of one month, gazetted competencies for each semester and erected a designed sign post reflecting concept for training laboratory students. Due to students' involvement, there has been greater improvement in laboratory results interpretation, working practices, and communication skills. It is recommended that all tutors should demonstrate practical lessons to students. There should also be workshops on active participation for tutors on how to engage students in learning practicals.

## CHAPTER ONE: INTRODUCTION

### 1.0 Overview

In this thesis, the researcher together with stakeholders agreed to strengthen learners' engagement to learn practical skills. Forty challenges as indicated in the appendix (iii) were identified to be affecting students' acquisition of competencies needed in the world of work. During the meeting low engagement in skills was the major challenge impeding students' learning of the required practical skills. When active participation was implemented at Kiwoko medical laboratory training school (KMLTS) there was a greater significant reduction of rote learning of standard operating procedure manuals and increased promotion of the ownership of learning practical skills by students as reported in chapter four.

In this chapter there is a personal and professional background of the researcher as a means of creating awareness to the reader of this thesis about who, what and from where his source of inspiration, interest, and courage to carry out this study originated. The researcher has, also given a presentation from future workshop model and work process analysis. The thesis encompasses background of this research project, which provides a reader of this report with an insight into the basis, purpose and above all the reasons why it was worth to carry out this study. The work of this project emanates from six previous projects that the researcher undertook since the beginning of this master's program whose results have been essential in directing the research project. Based on the findings of previous works of the six projects; Mulago Paramedical school, Kakira Sugar Limited, Jinja Vocational and Nakawa Vocational training institutes, and Rubona basket weavers and honey production. We (researcher & stakeholders) were able to state the problem under investigation and the objectives of this study, which have been our light and guide into the whole process of this research project.

### 1.1 Personal and professional background

I am a medical laboratory technologist whose competence is for clinical diagnostic, training of trainees, production of medical education materials among others. Presently I am an educational researcher student pursuing a masters' degree in vocational pedagogy under the Norwegian sponsorship at Kyambogo University. The opportunity to study at Kyambogo was due to the existing collaboration between Uganda allied health and management sciences – Mulago and Kyambogo University. My point of departure in this study emanates from my

experiences as a medical laboratory trainee and a tutor in medical laboratory institutions including KMLTS to mention a few.

By the time I joined the medical field at KMLTS – for a certificate in medical laboratory techniques, I didn't have prior training in medical subjects taught in the program, but I was expected to learn them as the training unfolded. At the start of the study at KMLTS, I had to choose one of the two options i.e. nursing or medical laboratory. I decided to undertake training at certificate level in medical laboratory technology for 2years. Learning in this program of Medical Laboratory techniques was a somehow challenging because senior technicians were not allowing learners to practice on their own. In other word learning was passive. The teaching and learning methods used did not cater for students' differences/interest. Teaching was more theoretical and teacher-centered as opposed to practical and active learning. There was more emphasis on mastering standard operation procedures theoretically than hands on.

However, driven by the inherent desire to perform better in my studies coupled with my hard work and commitment, I tried my level best to learn what I could afford in the limited time schedules of the program with the limited resources available. I arranged for special attachment in one of the laboratory in Nakasongola District for 4months. The exposure to practicals helped me to gain some hands-on skills, which I improved gradually through constant practice. By the end of my 2-year program, I was retained at KMLTS as a clinical instructor. Later, I was sent for Tutorship for two years at Makerere University. After completion, I was appointed to be the principal of KMLTS, a position I occupied up to this time. The current course in masters of vocational pedagogy has improved my style of teaching competencies needed in the world of work to learners. Having been taught and trained using the teacher-centered approach in both theories and practical, I thought KMLTS should adopt the best method to implement learning – teaching process. Therefore together with stakeholders, we chose active participation approach to teaching our students competencies needed in the world of work.

## **1.2 Interest and motivation behind the research**

The masters in the vocational program have helped me to know about various Learners competence acquisition challenges and their relation to particular teaching – learning methods along with national and international educational policies. And while studying in my first year, the researcher attended courses that strongly discussed the impact of learning theories, the world

of work and competence based education on learners' skills development. There were presentations made on Vocational didactics, work-based learning, and vocational pedagogy in professional life and schools, problem identification and research activities and, entrepreneurship skills in business – oriented activities by the learner and contemporary issues in vocational education and training. All these presentations and discussions encouraged me to study contemporary issues affecting skills acquisition of students at KMLTS.

Also, as a tutor in KMLTS and with a working experience of 9 years, I have noticed it's a disservice to our students, if the skills we are imparting to our students is not matching with a world of work "Hospital". Therefore, the researcher & stakeholders were much interested in allowing our students and families appreciate and build trust in the way the institute is promoting employability technical skills to meet patients expectations and employer's needs. The researcher was also driven by intrinsic appeal to schools to have a paradigm shift in teaching-learning methods while participating in the present study. The KMLTS staff were stuck on the traditional way of teaching. Therefore the major motivation of this study was to give a face-lift on teaching-learning process for learners' critical thinking, employability and lifelong skills development through work placements.

### **1.3 Work process analysis**

In a bid to demonstrate competencies needed in the world of work for quality diagnosis, learners should have adequate hands-on training. It is, therefore, prudent to critic KMLTS stages undertaken in imparting skills to their students. The Model, which was used in describing a work process analysis was designed and discussed according to Porter (1992) and Kleiveland (1994) procedures. The mentored researcher organized the Work Process (steps taken by Laboratory students to acquire necessary competencies). Later the skills acquisition steps were presented at the stakeholders meeting. The Key participant included, 78 % ( 36) second year learners of certificate in medical laboratory techniques, 4 Kiwoko Hospital (KH) laboratory –staff and 10.9%( 5) administrators, 2.2%(1) Kiryandongo Hospital laboratory staff, 2.2% (1) Nakaseke Hospital staff, and 4.3 % ( 2) Kasana Health Centre IV laboratory staff and 2.2% (1) community Leader. All stakeholders' views were helpful in the situational analysis. The meeting took place in recreation hall at Kiwoko Hospital on 12th/November 2015. It discussed stages for medical laboratory student's competence development before graduation as indicated in appendix ii.

Their critic on each stage aided the stakeholders and researcher to develop the action research study topic using a Future workshop model as shown in 1:4 of one chapter.



**Figure 1: MVP student at the work process meeting with stakeholders**

**Source: Researcher, 2016**

The MVP student presented the work production process analysis to stakeholders as shown above in the figure I. The duties/tasks and the required competencies at each of the eight stages in the production of competent laboratory personnel, each of the processes requires a particular set of competencies. At each stage in the process, stakeholders were free to brainstorm different challenges as indicated in the Table (i) in appendix I.

## **1.4 Background of the Study**

### **1.4.1 Historical**

The thesis of this study is based on the principles of action research and future workshop tool. This study skill culminates from the works of my first year's five projects. The first project was to improve time management of orthopedic students at Mulago Paramedical School. In this project students & researchers were able to share reasons why they come late and how to improve time management. In the second project, we intended to improve curriculum implementation to enhance students' clinical skills acquisition in the school of orthopedic medicine- Mulago; here we gained skills in work process identification and research topic identification using future workshop tool. In project three the competence was on Curriculum development, implementation and evaluation at Kakira Sugar Limited. Project four gave me an

opportunity to improve curriculum implementation to enhance students' clinical skills acquisition in the school of orthopedic medicine – Mulago. The fifth project tasked researcher to account evidence of indigenous knowledge and assessment at Rubona Community development project and Uganda technical college- Kichambwa. The experience gained from all five projects gave me a lot of writing skills and strategies that could be employed in the teaching and learning different skills and competencies at workplaces.

#### **1.4.2 Theoretical**

The Vygotsky's theory of Learning is the theoretical basis of this current study. The method was selected because it provided psychological evidence on how our social environment influenced the learning process. He (the Vygotsky) suggested that learning takes place through the interactions students have with their peers, teachers, and other experts. Furthermore, Vygotsky (1962) argues that culture is the primary determining factor for Knowledge construction. Learners learn through this cultural lens by interacting with others and following the rules, skills, and abilities shaped by our culture. Vygotsky further recognizes that learning always occurs and cannot be separated from a social context. Consequently, instructional strategies that promote the distribution of expert knowledge where students collaboratively work together to conduct research, share their results, and perform or produce a final project, help to create a collaborative community of learners. Hence knowledge construction occurs within Vygotsky's (1962) social context that involves student-student and expert-student collaboration on real-world problems or tasks that build on each person's language, skills, and experience shaped by each's culture" (Vygotsky, 1978). The Vygotsky theory cuts across to all teaching – learning strategies thought, for every institution that produces skilled graduates is a Vygotsky of some sort. Kart & Kahn argue that any university, including schools, regardless of its size and purpose, and the teaching – learning strategies adopted notwithstanding, is fundamentally concerned with how students acquire skills, knowledge, and attitude. This study was modeled on the postulates of Vygotsky theory because medical laboratory schools like other vocational training centers are always in constant motion of impacting employable and lifelong skills to their learners. Therefore, teachers need to create a learning environment that maximizes the student's ability to interact with each other through discussion, collaboration, active participation, and feedback.

### 1.4.3 Conceptual

Active learning refers to any instructional method that engages students to do meaningful learning activities and think about what they are doing (Bonwell, 1991) cited by (Prince, 2004). Marcia (2010) defines active learning as any teaching method, which gets students actively involved. According to Collins (2003), active learning is the processes of having students engage in some activity that forces them to reflect upon ideas and how they are using those ideas. The definition of active learning in this study adapted was from Maria (2010) and Collins (2003), who argued that active learning is an instructional approach that puts students at the center of learning by doing things and thinking about what they are doing. In this study, cooperative learning, Problem solving, active participation and experiential learning would characterize active learning through work placements. For the purpose of this document and readers, the word active participation will be used instead of student engagement. Since active participation is the consistent involvement of the minds of all students with that which is to be learned (Krause, 2008). Student engagement has been defined as “ participation in educationally effective practices, both inside and outside the class room which leads to a range of measure outcomes” (Kuhn et al., 2007).

### 1.4.4 Contextual

Work placements are an aspect of learning that all students are entitled to experience as part of a coherent curriculum (Virtanen, et al., 2009). Work placements or internships as it called in UK give students the opportunity to develop relevant skills, knowledge, and experience while getting the first-hand experience of life in a real working environment (Morgan, 2009) Learners learn based when actively involved in their learning during work placements of attachment. The training of students on hands-on is a good idea for KMLTS to start early than waiting until one has graduated to gain experience through active participation. The latter seems to be an apparent practice, which may be causing gross lack of employment among medical laboratory technicians because the job market is competitive and by showing a high level of experience, the graduate will always stand out. Lack of skills is a global problem. The International Labour Organisation (2012), says training institutions continue to produce graduates whose skills do not match what the market wants. This mismatch makes it harder to tackle graduates unemployment.

The classroom and skill laboratory at Kiwoko laboratory can serve as a clinical setting for work based learning through embedded activities such as case and problem-based studies, guided inquiry, simulations and experiments (Wurdinger & Carlson, 2010). When students are engaged in active learning through work placements, they see the relevance of their classroom learning, and develop increased motivation to Learn (Ambrose, 2010). Active participation should, therefore, be respected during teaching and learning process. If there are no precise approaches to support active learning, and particularly in work placements, the KMLTS will remain to emphasize the learning of concepts and theories through study and reflection on the abstract.

### **1.5 Future workshop model**

The Future Workshop as a research tool used to solve questions/problems perspective of the future. It was first used to addresses citizen groups' ideas with limited resources who wanted a say in the decision-making process in Norway (Sannerud, 2012). It was meant to shed light on how common problematic situation could be solved. Robert Jungk and Norbert Mullert in the 1970's developed the model (Apel, 2004). This model involved participants of a project in the process of working out solutions according to the existing situation. The method is an intuitive and analytic way to highlight problems and look for suggestions to solve them. The Future Workshop model was the best approach to handle situations of education and learning. Ever since its discovery, Norway people used it for developing a work-based learning at the construction site (Sannerud, 2012).

In this study, the Future Workshop was used to find out the most pressing challenges encountered during the period when students are expected to get actively involved in learning practical and possible solutions. The researcher together with the stakeholders organized the Future Workshop (Figures 2, 3, 4, 5 & 6) as indicated in the five phases including preparation, critique, fantasy/utopian, implementation and follow up. These are explained below.

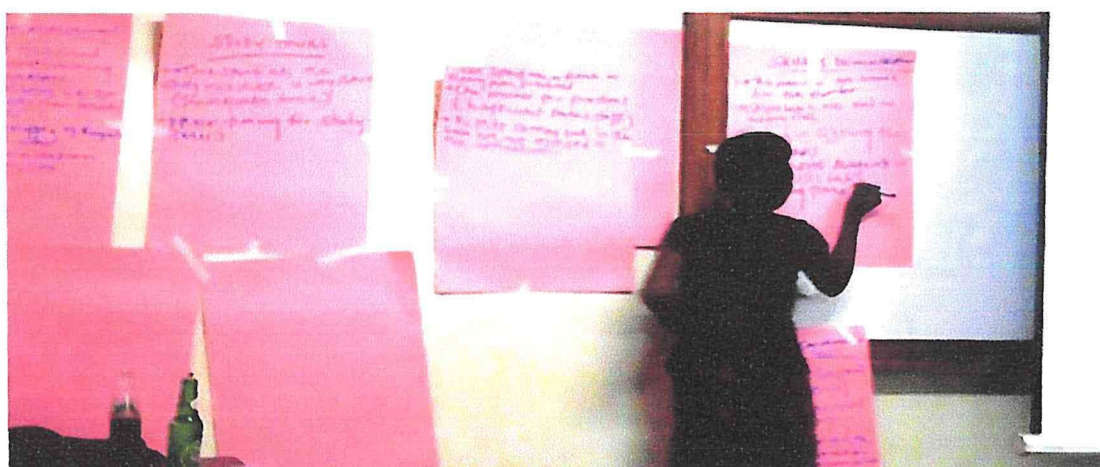
Preparation phase: Students of KMLTS, Kiwoko Hospital Laboratory (KHL) staff, lectures, community members and site supervisors from practicum attachment sites, all participated in the discussion voluntarily. The meeting took place on 20th /02/2016 in the recreation hall. The participants were informed of the freedom and democracy to take part in the study research before discussion



**Figure 2. Stakeholders preparing a room for meeting**

**Source: Researcher, 2016**

In this phase, all the stakeholders were free to present their views without fear or favor. The second phase is Critique phase. This phase marked the start of the workshop. Here, the problems encountered in delivering practical lessons to the KMLTS students were listed down through brainstorming as presented below. Ideas from all participants were respected equally, enabling members to open up freely.



**Figure 3. Stakeholder writing down identified challenges on flip charts.**

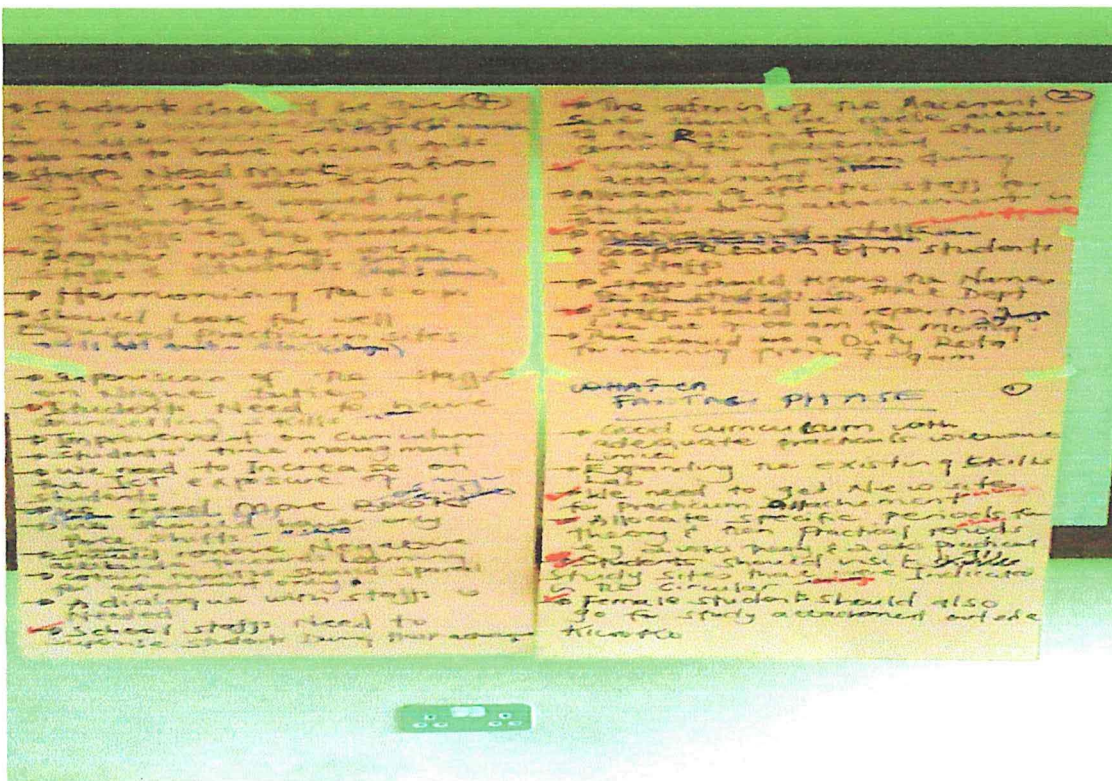
**Source: Researcher, 2016**

The Figure 3 presents a stakeholder writing on flappy charts challenges encountered by students, lecturers, and site supervisors in the impacting practical skills within the school and practicum sites for producing a qualified graduate. Noteworthy challenges in appendix ii are, congestion of students in hospital laboratory attachment, denying students to perform specialized tests like renal and liver functional tests, collusion in the Duty rota for practical skills in hospital laboratory attachment with actual classroom learning, teaching practical is tutor centred, not allowing students to perform practical individually, much time spends in theory than practical, Not allowing students to explore procedures outside central hospital laboratory and no time allocated to allow students practice practicals in groups, were democratically agreed during our meeting with stakeholders as the major challenge affecting skills acquisition at KMLTS. These challenges were summed up into a single action research topic (strengthening students engagement to learn practical skills) which was later taken to fantasy phase of the Future Workshop to find solutions for mitigating the challenges affecting skills acquisition as indicated in appendix iv and figures 4 and 5



*Figure 4. Stakeholders sharing utopia solutions*

Source: Researcher, 2016



**Figure 5. Utopia solution pinned on the wall**

**Source: Researcher, 2016**

The third phase In Fantasy/utopian phase. In this phase, stakeholders democratically generated ideal solutions, which had no barriers or limitations to their implementation to solve the problem of skills acquisition as shown above.

Implementation phase: This is also called reality stage where realistic and practical solutions were listed down, and the best-suited solutions were tabulated as indicated in appendix v. An action plan drawn indicated who does what, where, when, and how to implement the utopian solutions that were turned into practically implementable solutions as presented in appendix VI. In the reality phase, the perfect solutions were turned into practically implementable solutions. Democratically the best suitable solutions were chosen for implementation. Stakeholders democratically agreed and set up a monitoring system to ensure compliance with implementation of the best-chosen solutions.

Follow up phase: This phase is also known as a permanent workshop, where participants make a follow-up to assess the success or problems encountered while trying to solve the problem and find the way forward. The evaluation took place in September 2016.

## **1.6 Stakeholders concern**

Medical laboratory technology education in Uganda aims at producing clinical laboratory scientist, medical laboratory technicians, medical laboratory technologists and laboratory assistance that meet the demands of industry, hospitals, medical institutions and patients. (MOES, 2008). The emphasis is on the development of competencies through a series of logical, practical exercises, application of relevant knowledge and attitudes (MOES). It guides the trainers to select objectives, skills, and opportunities most relevant to the promotion of community health as opposed to the therapeutic approach used in institutional-based curricula. Thus medical laboratory education and training are expected to prepare learners for jobs that are marked by practical activities.

It was, therefore, our recommendation as ‘stakeholders’ that medical laboratory education should ensure that a student directly develops practical undertakings, knowledge base and expertise in medical laboratory techniques. For students to achieve hands-on, medical laboratory technology education is directed towards hospital needs. Therefore the training institutions should be to encourage to implement active learning or learning by doing. The Learning activities at school should be identical to the activities in the workplace so as to build capacity in the learner to apply the acquired knowledge and skills to the world of work. Bridging practicals between school and hospital is through the involvement of students in practical activities that are relevant to the needs of the patient and workplace.

At Kiwoko medical laboratory school more time is given to theory than practice. Learning practical was more of instructor-centered than learner-centered. In this case, the teacher decides on what to learn, how and when to learn it, where and why students should learn it. This approach renders learners to be passive recipients of the information that the teacher gives them through lectures or lesson notes. This type of teaching does not allow learners to have enough opportunity to exercise what is learned. So that they can learn from what they do instead, it encourages cram work, which consequently hinders skill acquisition and development. From the theories of learning covered in my first semester of the first year in this master's study program. I

have comprehended and noted that students acquire knowledge, skills and attitude when actively engaged in their studies. Students can therefore learn better when KMLTS adopts students' centered approach and tutors acting as facilitators. According to Maher & Mueller (2009), learner's interaction with their peer leads to challenging identification and improvement of cognitive skills. He argues that being attentive to one another's problem cause students to think about the previous misconceptions and challenge arguments, and this lead them to stronger arguments (Maher & Mueller, 2009). Thus helping students become more self-reliant and independent (Cerezo, 2004) and develop confidence and take ownership of their learning. Active participation improves students' academic success and instills intrinsic motivation. Medical Laboratory activities should, therefore, incorporate intellectual and social stimulation to engage students in Teaching & Learning (Ricks, 2010).

### **1.7 Statement of the problem**

The teaching and learning approaches at health institute aim to promote real –life work experience to the learners by allowing them to use their academic and technical skills to develop competences needed in world of work.' However, the current Teaching and learning approaches at Kiwoko health training institute make learners passive, inefficient on hands on learning and has inadequate resources utilization (in practical areas)'. Hence becoming less competitive for job market, which affects the family and student economically and psychologically. It's a dangerous precedent for the future of the whole country in training medical laboratory personnel whose sole aim is to diagnose patients' conditions for proper treatment administration. However, it's from this background that the researcher and stakeholders decided to use students' engagement strategy to promote ownership of learning among learners of KMLTS before the situation goes out of control. The gap of poor hands on, made the stakeholders carry out research study on how the School of KMLTS could strengthen students' engagement to learn practical skills through work placements while using school skills laboratory, Hospital teaching laboratory and practicum attachments sites?

### **1.8 Purpose of the Study**

The purpose of the study was to strengthen students' engagement to learn practical skills among students of KMLTS in Nakaseke district.

### **1.9 Objectives of the study**

Together with mentors and stakeholders we set out to employ action research technique in accomplishing our project with the following objective

1. To identify intervention measures that can be used to enable students to enjoy and retain skills needed in the world of work.
2. To implement interventions identified to allow students to maintain skills needed in the world of work.
3. To evaluate the impact of the possible intervention strategies that will enable medical laboratory students to enrich their practical skill acquisition.

### **1.10 Research questions**

1. What intervention can be identified to enable students to enjoy & retain skills needed in the world of work?
2. How do we implement interventions identified to enable students enjoy and retain skills needed in the world of work?
3. What impact can be caused by intervention strategies to enable medical laboratory students to enrich their practical skills acquisition?

### **1.11 Significance of the Study**

The study has contributed valuable knowledge in the field of active participation in general. It is the only study that has focused on the active learning of medical laboratory students. As such, it produced unavailable knowledge on the subject hitherto. The study has formed a useful material for reference to other researchers and other readers in general. The study has also suggested significant assessment policy statement through its recommendations. The study has made recommendations on workshops and assessment of competencies. Such proposals could make policy formulations in all Health institutions and related course. If the possible solutions identified and fully implemented, the KMLTS program would be in a position to produce competent technicians who can meet stakeholders' demands in labs, workplaces, and patient expectation. Thus the graduates would be "work-ready" to fit in the world of work.

## **1.12 Scope of the study**

### **1.12.1 Content scope**

The content scope of this project hinged on the research objectives and questions of this study. In the first and second objectives, the emphasis is on intervention to the challenges that learners face in acquiring practical skills at different levels of teaching practical and implementation of an intervention to enable students enjoy and retain skills during practicum attachment that is needed in the world of work respectively. In the third objective, the focus was bound on the impact of the possible intervention strategies that would enable medical laboratory students to enrich their practical skill acquisition.

### **1.12.2 Timeframe**

The first study took place on 12th/Nov.2015. The time frame is from 1st / Nov/ 2015 to 1st / Nov. 2016 to submit the thesis.

### **1.12.3 Geographical scope**

The study took place at the school of KMLTS which was one of the Training departments of Kiwoko Hospital. The Hospital is a community hospital affiliated with the Church of Uganda, in central Uganda in Nakaseke district.

## **1.13 Limitations**

This study is limited to the five teachers, including researcher, and the 36 students enrolled in during the academic year 2014-15 at KMLTS.

## **1.14 Definition of operational terms**

**Learning:** Learning in this study refers to a holistic process of acquiring and developing new or existing knowledge, skills, attitudes, behaviors, understanding, values and wisdom which may occur as a result of experience, habituation or by conditioning and may occur consciously or unconsciously.

**Teaching-** a process or activities that a teacher is involved in to ensure that learning occurs. It includes helping, guiding, counseling and mentoring students so that they can learn.

**Practical skills:** Means skills performed by hands using equipment, tools, and technology.

**Skill:** An ability and capacity through deliberate, systematic and sustained effort to smoothly and adaptively carryout activities or job functions involving ideas (cognitive skills), things (technical skills) and people (interpersonal skills).

**Student engagement:** refers to the degree of attention, curiosity, interest, optimism, and passion that students show when they are learning, which extends to the level of motivation they have to learn and progress in their education.

### **1.15 Conclusion**

Given the fact that for many years, teaching and learning at KMLTS have been theoretical and that learning has been passive, the concern for this research aimed at changing the traditional method of engaging students in acquiring practical. It is also a response to BVET Act 2012, for education reform to develop a learner –centred process, to make education relevant to the needs of students.

## **CHAPTER TWO: LITERATURE REVIEW**

### **1.0 Overview**

This chapter presents a review of literature related to skills acquisition through work placements for medical laboratory technology students. The primary strategy used to identify relevant literature included searching the CINAHL, Medline and Eric databases using a number of keywords that were developed following specific objectives under study. These included clinical placements, factors impeding skills acquisition, intervention for skills acquisition, implementation of the intervention to enhance skills acquisition and impact of an intervention to uphold skill acquisition. Additional information sources included quality monographs, reports, theses and dissertations from Kyambogo University Library.

### **2.1 Interventions and implementation of measures that can be used to enable students enjoy & retain skills**

To mitigate the challenges inherent in the work placement process and environment, a variety of clinical education intervention have emerged with the goal of enhancing students' skills acquisition (Zeira, 2010). This section outlines the implementation of the following interventions to quality clinical placements for skills acquisition : ( 1) Clinical placement (2) Modes of clinical supervision, (3) placement structure and length, (4) interprofessional placements, (5) technological advances, and (6) New teaching and learning the process.

**Clinical Placements:** Clinical placement is a vital component in preparing students for the reality of their role as professionals (Williams, 1994 as cited by Roby Nash, 2007). Perhaps not surprisingly, this experiential learning, or learning through placements experience is often deemed by students as more significant than that received in classrooms (Lambert & Glacken, 2005). A quality clinical placement is one that successfully achieves the aims of clinical education. According to Rodger et al., (2011), clinical work includes: quality of classroom teaching and the degree to meet student needs. The Newberry (2007), further argued that clinical education includes adequate preparation for professional practice, and efficient use of resources to achieve clinical skills

In clinical setting medical laboratory students not only apply knowledge, skills and concepts introduced in the classroom, they also learn to engage their compassion, thoughts, and Judgments and acquire the attitudes and values necessary for professional practice (Dun, 2008).

The exposure to clinicians, opportunity to communicate face to face with patients, interact with health care teams and practice skills under supervision, receive feedback on performance and reflect on experience is vital to the development of competence and the ability to function effectively as a new graduate (New et al, 2011).

Quality clinical placements provide students with opportunities for skill development, socialization into the profession, and a bridge between academic and workplace learning (Rodger et al, 2011). The clinical placements identified by students and clinical facilitators are the most substantial learning experience for a learner to become a competent health professional worker (Koontz et al., 2010). Even though consensus about the importance of the clinical learning experience, issues about the quality of the placement process are still questionable in people's domain.

Models of supervision: Research investigating group supervision has been mixed with some students in some studies rating it as less favorable when compared to individual mentorship (Sheepway et al, 2011). According to Bourgeois et al (2011), cluster models of eight students in one shift with one supervisor have increased students learning, satisfaction, and placement capacity. However, peer supervision appears more promising in some studies (Brown, 2009). In its simplest form, peer supervision involves two students paired together throughout the placement. This approach facilitates learning by easing the transition from the classroom to the clinical learning environment (Ruth-Sahd, 2011). Another peer supervision model is one where two students pair with one supervisor (Du Plessis, 2004). Watt et al. (2011) reported the following modalities to reduce students' anxiety and increasing efficacy during work placements: peer mentorship, reflective activities, and low-fidelity simulations in medical laboratory procedures, interpreting and documenting patient lab results, and typical clinical scenarios.

Length of placement: The longer placements of medical laboratory students, in particular, have been evaluated as more effective to promote skills acquisition (Hudson et al. 2011). For example, weekly clinical placements have improved learning in U.K, where medical laboratory students attend their clinical placement for two to three days a week and spend the remaining days attending lectures, tutorials and skill labs (Kevin et al, 2010). Results from Clinical placements where students spend more than 20 weeks, Show that students were more efficient,

with increased likelihood of returning to the work placement (Smedts, 2008). Similar results of other studies show that longer placements increase students' patient responsibility, examination-driven learning, program flexibility to address educational gaps and a robust and positive perception of institutional continuity (Mihalynuk 2008).

**Inter-professional placements:** Recent literature has proposed inter-professional collaboration in work placements, suggesting that the clinical environment is an ideal setting for developing students' collaborative practice skills (Dubouloz et al., 2010). Hilton & Morris (2011) recommends case conference, team meeting, and Laboratory results interpretation rounds are necessary activities that can facilitate the development of students' communication skills and ability to work collaboratively with others. Dubouloz et al., (2010), believed that collaboration among healthcare professionals is the key to quality care for patients.

**Technological advances and simulation:** Technological interventions that are capable of providing an opportunity for skills acquisition during clinical placements include web – based clinical learning and simulations (Baillie, 2009). The integration of web-based virtual patient cases in clinical placements has made students to develop their medical knowledge and skills while alleviating pressures of accessibility to both patients and supervisors (Berman et al. 2009). The use of online Digital Microscopy (DMs) in the education of pathology students has been shown to be an effective teaching method. According to Curzio (2009), simulations are activities which mimic the reality of clinical environments. The use of simulations in healthcare education is becoming increasingly common every day (Baillie & Curzio 2009). In the simulation, students learn in a realistic clinical environment where they can practice their skills without risk to patients and then apply these skills in a clinical placement (Harder 2010). Studies of the effect of simulations on students' and supervisors' experience of clinical placements indicate improvement in learning, professionally and clinically relevant (Williams et al. 2009). Simulations have been found to increase student engagement, their psychomotor and clinical reasoning skills, self-confidence, self-efficacy, ability to manage strange situations, and satisfaction with learning (Harder, 2010).

**Active learning approaches:** Active learning requires more than the traditional taking of notes from a lecture session (Prince, 2004). According to Felder (2003), the core elements of active learning are students' activity, engagement, and reflection. Active learning encompasses a

broad range of pedagogic approaches commonly used in medical institutions. Evidence has it that for a clinical facilitator wish to engage students in life – long learning process, the use of higher order academic skills such as collaborative learning, cooperative learning, and problem-based learning, Community of practice, Work-based learning are significantly essential in increasing students skills acquisition at work placements.

**Collaborative studying:** Collaborative studying is a method of teaching and learning in which students' team together to explore a significant practical work/question or create a meaningful project (Prince, 2004). Examples of collaborative studies are a group of students sharing a lecture and students from different schools a shared assignment. The collaborative learning is rooted in LevVygotsky's concept of Learning called Zone of Proximal development (ZPD). The ZPD is the difference between what a learner can do without help and what he or she can do with help. According to Wass & Golding (2014), tutors can assign tasks that students cannot do on their own, but which they can do with assistance. They should provide just enough support so that students learn to complete the tasks independently and then create an environment that enables students to do harder tasks than would otherwise be possible.

Additionally, in this type of learning, students learn something together which promotes critical thinking. According to Gokhale (1995), students can retain more information when they work in a group rather than individually. Unlike individual learning, where students engaged in collaborative learning capitalize on one another's resources and skills (Lee & Hyunkyung, 2014). Thus, collaborative learning facilitates groups of learners working together to search for understanding, solutions, create an artifact or product of their learning.

**Co-operative learning:** Cooperative learning is a student – centered instructional process in which small, deliberately selected groups of three to five students work interdependently on a well-defined learning task (Felder et al., 2003). Co-Operative Learning is not so much learning to cooperate but rather co-operating learn. Cooperation means working together to achieve shared goals, so it is an instructional technique in which learners work together in small groups to help one another to achieve a common learning goal (Killen, 2007). Students are held accountable individually for their performance, and the instructor serves as a facilitator in the group learning process. According to Feden & Vogel (2003), co-operative learning is a

structured form of group work where students pursue common goals while being assessed individually.

At its core, cooperative learning focuses on the premise that cooperation is more efficient than competition among students for producing positive learning outcomes. When students work in groups, there will be the creation of a natural environment in which to promote effective teamwork and interpersonal skills. Macgregor et al. (2009) recommend explicitly training students in the skills acquisition using cooperative learning approach. Johnson and Johnson (2008) report that social skills tend to increase more with cooperative rather than competitive or individual situations. Terenzini et al. (2001) report that students improve team skills as a result of cooperative learning.

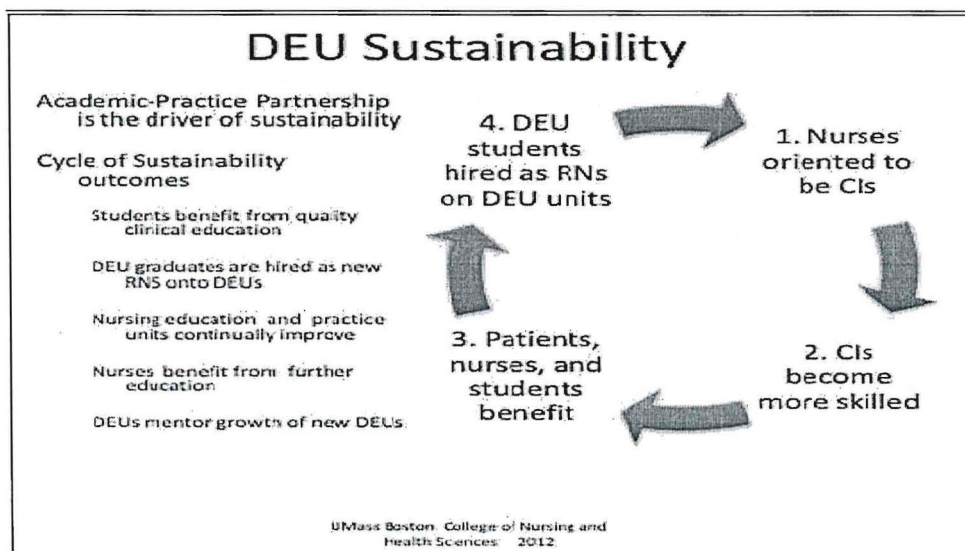
**Problem-based learning:** Problem – based learning (PBL) is an instructional strategy in which important problems are introduced at the commencement of the instruction cycle and used to provide the context and motivation for the learning that follows (Norman & Schmidt, 2000). PBL typically involves significant amounts of self- directed learning on the part of the students and is ever active and usually collaborative or cooperative. Studies suggest that PBL develops more positive student attitudes foster a deeper approach to learning and help students retain knowledge longer than traditional instruction (Colliver. 2000). Further, just as cooperative learning provides a natural environment to promote interpersonal skills, PBL provides a natural environment for developing problem-solving and life-long learning skills. Indeed, some evidence shows that PBL promotes enhanced problem-solving skills in medical students and that these skills are improved further by coupling PBL with explicit instruction in problem-solving (Vernon & Blake., 2003). Studies also suggest that students will retain information longer and perhaps develop enhanced critical thinking and problem-solving skills if PBL always supported with explicit instructions in these skills. From the information given it, PBL is a student – centered approach in which the teacher acts as a facilitator. This method of teaching learners is mostly common used in medical laboratory studies. PBL involves students working with a group to collaborate, sort their knowledge, and present a solution with explanations (Cerezo, 2004). A dominant form of collaborative work involves group members depending on each other to create, challenge, and process new ideas (Francisco & Maher, 2005). Studies have shown that students who learn through a problem-based approach exhibit higher achievement in theoretical work and

practicals dealing with realistic situations than do students taught in traditional content-based learning environments (Boaler, 2008).

**Communities of practice:** Communities of practice are the cluster of people who share a worry or a passion/zeal for something they do and learn how to do it better as they regularly interact (Wenger circa 2007). Indeed Kiwoko medical laboratory students are brought together by joining in joint activities during practical attachment, self – directed study and by ‘what they have learned through their mutual engagement in these activities. Therefore Learning involves participation in the community of practice. Wenger (2002) argued that learners participation ‘refers not just local events of engagement in certain activities with certain students but to the most encompassing process of being active participants in the practices of social communities and constructing identities about these communities. Thus learners’ intentions to learn are engaged, and the meaning of learning always configured through the process of becoming a full participation in school activities. Lave and Wenger (1991) argued that, as the learner moves from the periphery of the community to its center, he develops into more active and engaged within work placement and eventually assumes the role of an expert. Brown, Collins & Duguid (1988) emphasize the idea of cognitive apprenticeship, which supports learning by allowing students attain, develop and use cognitive tools in authentic domain activity.

**Work based learning:** The term ‘work based learning’ is becoming ubiquitous, particularly in the context of discussions about medical laboratory technology at all levels of education. It is widely used throughout the literature, academia, and industry to describe a multiplicity of approaches by which one can learn through work (Tikkamaki, 2006). According to Collin and Villeda, (2005) WBL involves a cluster of concepts, including lifelong learning, employability, and flexibility. Work – based learning is a way for students to develop their potential (Boyer, 2009). It also contributes to the development of professional identity and can boost the self-esteem. Learning on the Job allows those in employment to develop their potential while maintaining their earning (Gallacher, 2009). The WBL involves learning at– in the workplace, learning through work – learning while working, learning for a job – doing new or existing things better and learning from work – using the experience of work (Billett et al., 2005). It is now clear that through work-based learning, students have the opportunity to see how classroom and skill development laboratory instructions connect to the world of work and future career opportunities.

Models of clinical learning: In Australia, two models have been commonly used for the purpose of educating students in the work placement or clinical setting: Supervision and preceptorship models (Grealish & Carroll, 1998 as cited by Robyn- Nash, 2009). Essentially the supervision model involves a facilitator (employed by the institution) working directly with a group of students (usually on a 1:8 ratio) in a work placement (Mckenna & Wellard, 2004). A preceptorship model generally involves a practicing Laboratory technician providing onsite individual clinical supervision/teaching on 1:1 basis for agreed period of time (Mckenna & Wellard...). These two models (Supervision and preceptorship) are obsolete. Students who have been experiencing these models at Kiwoko Hospital have reported feeling supported by a dedicated clinical teacher, particularly someone who is not seconded by the Hospital in which students are placed. Whilst the models described and above are still used, findings from a study by wellard et al. (2000) highlight the push for diversification that has occurred more recently in Australia's clinical education teaching. An example of such diversification includes the dedicated unit (DEU) Model developed by Finders University (Edgecombe et al. 1999; Gonda et al.1999). Reasons for diversification include economic pressures affecting both health and education sectors, difficulties in attracting and retaining sessional staff, problems in having hospital laboratory technicians released to provide clinical supervision, challenges associated with role confusion for laboratory technicians seconded to the institution on temporary basis and, due to a scarcity of clinical places, the need to use all available options even where the facilitator: students ratio may be higher than 1:8. Therefore the work placement learning for skills acquisition is to be based on DEU clinical education model. The development of First DEU model was developed at the Flinder's University of South Australian School of Nursing in 1997(Edgecombe, et al. 1999). It was designed with the intent to create the most optimal hands-on learning arena for nursing students with the purpose of enhancing collaborative relationships between clinicians and academics. It has been used in New Zealand in 2007 as the primary model for clinical nursing experience (Edgecombe et al.2009). According to Casey et al. (2008), Nursing students and staff in New Zealand who have used DEU model in clinical setting reported: quality placements, increased clinical placements, better alignment between theory and practice, higher levels of work Satisfaction, and closer working relationship with staff, better communication, and more consistent assessment practices.



**Figure 6. Dedicated unit (DEU) Model**

**Source: umass Boston College of nursing and Health sciences 2012.**

Interpretation of the Model: The concept of DEUs is a relatively new concept and an equally new way of clinical instruction. Thus, literature and Laboratory research regarding this model are limited. According to Moscato et al. (2007), a dedicated education unit is “a client group built up into most favorable teaching/learning environment through the collaborative efforts of staff, management, and institution.

Implementation of a DEU as an educational model strengthens the continuity in the duration of clinical practice and ample opportunity for learning. Students on the DEU are meant to work with 1-2 Laboratory staff for the length of the semester. Laboratory Staff is given the title Clinical Instructor (CI) enhances continuity for students and the laboratory staff. The consistent pairing of the student to CI allows student learning on a greater personal and professional level. Students no longer need to criticize their skills and competencies, as compared to the conventional model. Students know their CIs on the personal basis. Once personal identity established students’ opportunity to develop clinical competencies improves as a result.

## 2.2 Impact of intervention measures to enable students retain skills.

The literature review in this section is based on an evaluation of four models of clinical facilitation used in work placement learning. This discussion has been included because it is highly relevant to the present study. The models target in this section are those that has been used mostly commonly for the provision of skills acquisition through supervision or preceptorship: (1) Full-time academic staff facilitating on a 1:8 basis (2) Sessional staff facilitating on 1:8 basis (3) seconded staff facilitating on a 1:8 basis (4) preceptor facilitating on a 1:1 Basis. According to Ellis & Hogard (2001), students enjoyed their clinical placements – regardless of the model of facilitation that was used and valued the opportunity to “put their theory into practice” in particular they appreciated the input from their clinical facilitators and felt that clinical teachers had played a key role in their clinical learning and development.

**Full time academic staff facilitator:** The institution facilitators are not members of the clinical practicum attachment site staff and are outsiders of the Healthcare facility staff. In Australia, the moderator/facilitator: student ratio has commonly been 1: 8 (Grealish & Carrol, 2008). The facilitator is responsible for student briefing and debriefing, an organization of student assignments, direct clinical teaching, Liaison with health agency staff, consultation with students regarding their progress and student assessment. However, Karuhije (2009) have made the observation that those who are competent in the classroom are not necessarily skillful at teaching in the practice setting. At institutions level full-time staffs are busy with their teaching, scholarly, community service activities, marking and administrative functions (Karuhije, 2008). In combination with increasing student enrollments, these factors have necessitated the employment of sessional clinical facilitator in Australia (2006).

**Sessional staff facilitator:** Sessional Facilitators hired for short periods of activity when students are on work/clinical placement (Wong, 2007). Importantly, these staff may have clinical expertise, but less academic preparation and less familiarity with the curriculum than full-time institution members and have little or no knowledge of and or experience in clinical teaching (2004). Thus, although orientation and professional development sessions are part of their preparation for the role (Duke, 2006), these facilitators are less attuned to curriculum goals and can experience a range of difficulties including the evaluation of student performance (Wong, 2007). The recruitment and retention of sessional facilitators are also difficult as the workload is sporadic/irregular, no security of tenure, and the casual nature of the work means that the staff

does not qualify for sick leave, annual leave, or other entitlements that other employees enjoy (Napthine, 2006). The lack of belongingness within the healthcare facility associated powerlessness and isolation lead significant drawbacks to this role (Brennan, 2011).

**Seconded Facilitators:** The seconded facilitator is a medical laboratory technician employed in a health care facility who is appointed under an agreement between a university and a medical center to act as a clinical facilitator for the duration of a particular clinical practicum (Melander, 2004). They are generally regarded as experienced technicians with valuable clinical decision making and critical thinking abilities who are able to make significant and direct contributions to students' clinical education (Lambert & Glacken, 2005). The seconded staffs are relieved of their regular work responsibilities so that they take the role of a clinical facilitator with ease. According to Reid (2009), some seconded staffs are very good clinical teachers, others lack pedagogical preparation, sufficient knowledge about the course, and recent developments in clinical practice.

**Preceptors:** Similarly to the sessional and seconded facilitators, preceptors are responsible for assessing learners' needs: For planning, teaching, supervising and role modeling; and providing evaluative feedback (Morgan, 2005). The problem with this model is that many preceptors may not have the skills expected for their teaching role, particularly in the area of assessment/evaluation (Infante, 2005). Preceptors have identified that most the rewards they gain are intangible (Alspach, 2003). The tangible reward identified include active involvement in curriculum development, attendance at institution meeting, Luncheons, workshop involvement and seminar teaching opportunities (Davis, 2009). However, the question concerning benefits to preceptors, if the only benefits to be gained are intrinsic or intangible in nature, the long-term involvement of these staff in clinical education may not be sustainable.

### **2.3 Summary and conclusion**

Under this Literature review, I have documented various scholars' information that I found relevant to the subject under study. In summary, literature did not spell out well how students' engagement in work placements attributes support to student learning. Therefore being a practitioner and a teacher for medical laboratory students with major role in creating a positive learning Environment through being approachable, enthusiastic about students, respectful of students, available when needed, communicates effectively and provide

constructive feedback on students' performance. The research has made it more clearly on how students should be engaged to study practical skill. Medical laboratory is a practice – based discipline and a minimum level of competence are required for registration/Licensure to practice as a medical laboratory technician. The ability of registered medical laboratory technician to fulfill their clinical roles is dependent to a large extent on the clinical preparation that occurs during the pre-registration course.

## CHAPTER THREE: METHODOLOGY

### 3.0 Overview

Democratically research topic generated. It started by defining the work process through which laboratory students go through before graduation and work in the world of employment. The research topic identification had two steps: identification of tasks and competencies required in training medical laboratory technician. The discrepancies in the process were identified and noted on the charts as seen in chapter one. The Future Workshop was used to find solutions to the challenges encountered in skills development at different levels of exposing students to practical related to the world of work and patients expectations. Thus, this chapter has described research design, the concept of action research, study participants, sampling strategy, tool and techniques, quality control, data management and ethical consideration for the study.

### 3.1 Research design

The study was a voluntary and a participatory action research .According to Daniel Selener cited in (Reason & Bradbury,2001) described participatory research as a process through community members identify a challenge, collect, analyze and act upon in order to find solutions and promote social and political transformation. Based on the above definition and explanation of action research, the researcher found the use of participatory action approach relevant and appropriate for this study. This was also in line with Kemmis & Taggart. (2000) who argued that participatory action research engages people in examining their social practices that link them with others in social interaction. I strongly agree with them (Kemmis & Taggart) because participatory action research explored the practical methods of communication, production, and social organization and tried to study how to improve their interactions by changing the acts that constitute them. That was to reduce the extent to which participants experience these interactions as irrational, unproductive, unjust, and unsatisfying. Participatory action research was used also because the study aimed at understanding social situation of Kiwoko medical laboratory school with a view to improve the quality of skills acquisition through work placement. This was supported byKurt Lewin (2012), a social psychologist, who felt that the research needed for social practice should be a form of ‘ social management’ carried out by researchers and practitioners working together to achieve social change through Joint problem solving (Warrican, 2006). This therefore justified my choice of the research design in that the data of this study basically took the form of written descriptions of my experiences, reflections and those of the

stakeholders in democratic manner. An action research was adopted to identify the factors affecting Students practical skills acquisition in the pursuit of student engagement to learn practical.

### **3.1.1 Fundamental concepts of action research**

As indicated above, action research addresses real-world problems occurring within complex social context. According to Borda (2009), Action research aims to help people investigate reality to change it and to change reality in a view to studying it. In particular, by changing their practices through a spiral of cycles of critical, self-critical action and reflection, as a deliberate process designed to help people learn more about their practices, knowledge, social structures and the social media in which their practices expressed and realized. It is a process of learning by doing- and learning with others by changing the ways they interact in a shared world. Thus action research focused on real-world concerns – not abstract practices and involved learning about the day to day, materials, concrete, particular practices of particular people in particular circumstances (Kemmis and Wilkinson, 1998 as cited by Robyn Nash, 2007). The investigation took place in the workplace, and no attempt was made to control the research context per se. Indeed action research aim explicitly at both taking action and creating knowledge or theory that work (Bradbury, 2001). In contrast to more positivist paradigms, action research is concerned with doing research with and for people rather than on individuals (Reason, 1988). Therefore the current study was set in the real world of clinical practice for medical laboratory students. The impetus for the study arose from a felt need... to initiate change from clinical, academic staff, community members (end users) and Hospital staff involved in the management and day to day conduct of students' practicum. The questions that arose from the concerns of stakeholders about the practice of clinical education improved clinical practice.

### **3.2.2 Phases of action research**

The action research methodology employed in this study was largely informed by the writings of Argyris et al. (1985) and Kemmis & Wilkinson (1998). According to Argyris et al. the central tenets of action research include:

Change experiments on real problems in social system,

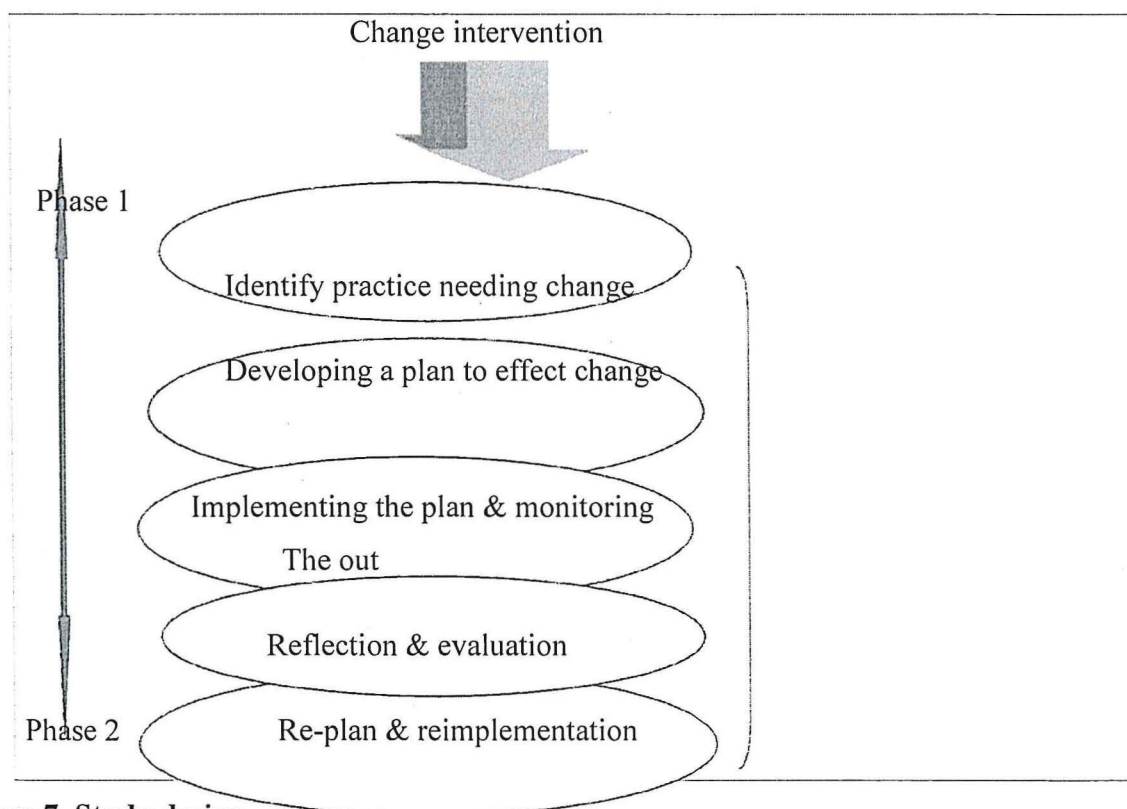
Iterative cycles of identifying a problem, planning, acting and evaluating,

Changing established patterns of thinking and action,

Changing the status quo from a participative perspective, and

Simultaneous contribution to social science and social in everyday life.

Kemmis and Wilkinson (1998), in their views, suggested that action research has seven key features: iterative, social by nature, participatory, practical and collaborative, emancipatory, critical and recursive, i.e., reflective. Kemmis... argues again that these features are at least as important as the self – reflective spiral, which, for many, constitutes what action research is about. The present study attempted to achieve these qualities, with particular emphasis placed on the participatory, practical, collaborative, and critical dimensions. This was done through academic and clinical staff, Hospital administrators, and community members working collectively and individually. As indicated earlier, the methodology of action research typically consists of a series of commitments to observe and identify problems in work placements and proceeds in a series of spiral each composed of planning, action, observation and evaluation of the results of action. Further, Althea (1994) has argued that, because action research is context specific and always about taking action and evaluating the impact of work on practice, a change intervention is central to the model. Thus the study will be undertaken in successive iteration with each iteration comprising a basic action research cycle of planning- action – evaluation and reflection as shown in figure (6).



**Figure 7. Study design**

**Source. (Adapted from Pratt et al.2001)**

This phase was contained within earlier write-ups that had been reported in the chapter one. Thus the present study has been built on to this earlier one successive cycle of an action process. As shown in figure (i) all cycles have been done. Phase 1 or cycle one – was about assessment of the practice needing change, implementation and initial evaluation of a Change intervention and phase 2 – was for refinement, re-implementation, and re-evaluation of the quality of clinical setting for medical laboratory students at Kiwoko Hospital Medical laboratory school. This thesis report has accommodated both cycles of action research.

### 3.3 Study Area

The study was conducted at Kiwoko medical laboratory training school located in Nakaseke district, central Uganda, 54miles north of Kampala and 14miles from Luweero town. The center had a capacity of 80 students. The school has a big catchment area of Luweero Triangle (Nakaseke, Nakasongola, Luweero, Mityana and Wakiso Districts). According to school records, the school has three main hospital practicum attachments, i.e., Nakaseke Hospital, Kiwoko Hospital, Kiryondogo Hospital and one skills demonstration laboratory. Hence

justification why the researcher selected the area for improving students' skills acquisition through work placements.

### 3.4 Study Participants

The key participants of this study were 78 %( 36) second-year learners of the certificate in medical laboratory techniques. The selection of this group was based on the fact that I knew their process of acquiring practical skills. Other key participants include 4 Hospital laboratory – staff, 10.9 %( 5) Tutors, 2.2 %( 1) Kinyandogo Hospital laboratory staff, 2.2% (1) Nakaseke Hospital staff, and 4.3 %( 2) Kasana Health centre IV laboratory staff and 2.2% (1) community Leader. These views of additional participants were helpful in the situational analysis as indicated in chapter one. Their information was more interactive and instrumental for the progress of this action research proposal. This was in agreement with Billet (2001) who argued that, engagement of stakeholders in problem solving ensures better implementation of the suggested solutions.

#### 3.4.1 Sample Size

The sample size was determined using Krejcie and Morgan (1970) table for determining sample size (Appendix xv). This is where already designed table with different ranges of population is used to determine sample population size.

**Table 1: Categories of participants involved in research**

Category	Study participants	Sample size	Selection technique
Second-year learners	40	36	Simple Random
Hospital laboratory –staff in charges	4	4	Census
Staff Tutors	5	5	Census
Kinyandogo Hospital laboratory site supervisor	1	1	Census
Nakaseke Hospital site supervisor	1	1	Census
Kasana Health centre IV laboratory alumni	2	2	Census
community Leader	1	1	Census

**Source. Researcher**

### **3.4.1 Sampling techniques.**

The categories of participants in the study shown in Table 1. The participants were selected either by simple random sample or census.

### **3.4.2 Simple random sampling**

Simple random sampling is a technique where every member population has an equal opportunity of being selected (Muganda and Mugenda, 1999). Random sampling was used in this study purposely to increase the reliability of the survey estimates for obtaining samples that were unbiased and representative of the target population. Thirty-six papers were labeled with letter one while four papers marked with letter two. The forty paper were mixed up and put in the basket. The forty students were asked to pick one paper each. Those who picked papers that labeled with letter one were allowed to join the study.

### **3.4.3 Census study**

A census is a study that obtains data from every member of a population (patton, 1990). A census occurred because entire population was very small and data was gathered on every students.

## **3.5 Methods and tools for data collection in the Study**

Research methods are various procedures, schemes, and algorithms used in research. All methods (Techniques and Tools) employed by a researcher during a research study termed as research methods (Kothari, 1985). Techniques being practical ways of collecting data and for analyzing the information obtained in the investigation process while tools are the instruments used in the process (Mikkelsen, 2005). Ary et al. (2010), assert that while the choice of the method in research depends on what he/she is studying or what he/she intends to study out. Kyaziri (2012) ( as cited in Ary et al.,2010) argue that what is most crucial in deciding which method to use is the research question where they say that the investigation methods should follow research problems in a way that offers the best chance to obtain useful answers. The methods that were used to collect data included; Document analysis, interviews, observation, photography, and Audio – Visual, Group discussion, Work process and Future workshop.

### 3.5.1 Instruments of data collection

**Table 2: Summary of methods and tools for data collection**

Methods	Instruments
In-depth Interviews	Future workshop
Participant observation	Work process analysis
Documentary analysis	Video camera
Group discussion	Recorder
	Still camera
	Log book
	Pencil and pen

**Source: Researcher, 2016**

#### 3.5.1 Document analysis

Records review was a form of qualitative research in which documents were interpreted by the researcher to give voice and meaning around topic assessed. This method helped the researcher in initial stages of the research to establish the ideological roots of the study. Documents analysis clarifies ideas and develops methodology and in later stages helps the researcher to enhance and consolidate knowledge based and integrate findings with existing body of knowledge (Kumar, 2000). The researcher used this method to find out what other scholars have acknowledged about research topic so as to guide the research methodology. The records analyzed public records (students practical confidential forms, attachments reports, assessments policies, work placement policy, MOUs, students reports, and curriculum), personal documents (students log books and reflection Journals) and physical evidence (handbooks, training materials, duty roasters and posters).

#### 3.5.2 In-depth interview

A qualitative interview seeks to understand the world from the interviewee's point of view, to unfold the meaning of their experiences, to uncover their lived world prior scientific explanations (Kvale & Brinkmann, 2009) (as cited in Kyarizi, 2012). Interviewing is, therefore, a valuable assessment tool that allows participants to share their experience, attitudes, and beliefs in their words. Based on the degree of structuring, interviews divided into three categories:

Structured interviews, semi-structured and unstructured interviews (Fontana & Frey, 2005). The unstructured interview was used to collect data from stakeholders (Students, Hospital staff, Tutors and OBS, OGS) on challenges encountered in impacting skills to learners. Therefore the researcher selected to use unstructured interview because of its nature of flexibility of participants that allowed questions to emerge from the immediate context of presentation. Minichiello et al. (1990) defined them as interviews in which neither the question nor the answer categories predetermined. Instead, they rely on the social interaction between the researcher and informant. Punch (1998) described unstructured interviews as a way to comprehend the complex characters of people without superimposing any prior categorization, which might limit the field of inquiry. While the definitions are not the same and also there is more agreement about the essential characteristics of unstructured interviews. The format of asking questions was open-ended questions, and informal conversation enabled stakeholders to give the necessary qualitative data. Patton (2002) cited by (Kyarizi, 2014) describes open – ended questions as a type of interview where the exact responses and sequence of issues determined in advance and all stakeholders asked the same basic questions.

### **3.5.3 Participant Observation.**

Observation is a systematic data collection method where a researcher uses all of their senses to examine people in natural settings (Savage, 2000). Marshall & Rossman (1989) (as cited in Barbara, 2005) defined observation as ‘‘the precise description of events, behaviors, and artifacts in a social setting chosen for study. The participant observer has to develop the ability to learn the language of the people studied, learn insider phrases, to remember things that happen or observed in the field and write comfortably observed data. The researcher used participant observation to monitor how participants responded to different questions emerging from work process presentation. The rate of student interactions while dealing with learning skills, the amount of active learning while operating in their group discussions, concentration on the learning skills and commitment to their learning activities were other observed events. My principal purpose for using this method was to obtain empirical data from the story of the actions as it unfolded as reported in chapter one.

### **3.5.4 Photography**

Photography is the science, art and practice of creating a strong image by recording light, either electronically employing an image sensor, or chemically using a light material such as photographic film (Peterson, 2011). I used photographs in this study as a way of presenting data, not only because photos are amazing but also because the translation of the pictures to text could give an equally full, lively and complex picture. According to Warren & Karner (2005), the purpose of photographs in the study is not only to motivate the interviewee to tell about their everyday lives or remember the past events or to unlock forgotten information but to reveal participants hidden views and values. For instance chapter one shows some pictures taken during phase 1 of action research.

### **3.6.6 Group discussion and dialogue**

According to Bolm (1996), dialogue is a stream of meaning flowing among and through us between us, which will make possible the flow of meaning in the whole group out of which emerge some understanding. Thus it is a free flow of meaning that balances inquiry and advocacy in one's attempt to bring about a common understanding of a given phenomenon among the group members. Dialogue helped the researcher to understand participants' responsibilities, interests, needs, availability for the research process and plans for improvement. During the panel discussion, the researcher democratically allowed equal opportunity to all participants to contribute, one after another using stakeholders' interview. Group discussion is defined as – a form of systematic and purposeful oral process characterized by the formal and structured exchange of views on a particular topic, issue, problem or situation for developing information and understanding essential for decision-making or problem-solving (Wang et al., 2014). The stakeholders' were free to interact without being criticized or influenced by the researchers to get full information. The investigator's role was to record data and keeps the discussion in progress

### **3.7 Procedure for data collection**

The researcher developed work process for learning practical skills in School of Medical Laboratory Kiwoko for two weeks under the guidance of the mentor. Once the work process was ready, the researcher sought permission from the coordinator of master's in vocational pedagogy to proceed with the study. The co-ordinator issued an introductory letter to

the medical director of Kiwoko Hospital and training institutions. Once the permission was granted, the researcher proceeds to KMLTS to book for the date of presentation and action research. And the date selected was 17th /11/2015, time 2.00pm and venue was Kiwoko training institute recreation hall. Qualitative data collected from fifty (50) participants during work process presentation and future workshop using interviews, observation, photography, and audio – Visual and Group discussion. The data written on flip charts by a stakeholder who acted as a secretary to the participants.

### **3.8 Data analysis**

Data analysis typically occurred following completion of all data collection in quantitative research. But since the research design of this study was qualitative in nature data analysis begun during data collection. It continued throughout the remainder of the process of the action research study. Johnson (2008) suggests that “as you collect your data in qualitative action research, analyze using themes, categories, or patterns that emerge. This analysis influenced further data collection and analysis by helping you to know what to look for”. The choices of data analysis we used in this study emanate from the type of data collected ‘Qualitative data’ and action research questions. From the above description, the data gathered analyzed with the help of an inductive process, where the action researcher examined data for both patterns and similarities.

### **3.9 Quality control**

#### **3.9.1 Validity**

Validity indicates the degree to which a questionnaire measures the construct under investigation (Ritchie, 2003). For a data collection instrument to be considered valid, the content selected and included must be relevant to the need or gap established (Lewis, 2003). Before the actual study, the work process analysis discussed with a mentor. The feedback from the instructor and the experts helped me in modifying the work process for presentation to KMLTS Stakeholders. Validity achieved by undertaking strategies (work process and future workshop) to investigate the problem from different stakeholders and strengthen the validity of the findings. All questions posed in the interviews were directly linked to the research’s aim and objectives and covered all aspects of producing competent graduate ready to work. Data was also transcribed and analyzed with a very high degree of accuracy. One of the transcriptions was

validated and rechecked with the interviewee to ensure the correctness and the accuracy of the data. Finally, all secondary sources of evidence used were initially assessed to determine the validity of the information given.

### **3.9.2 Reliability**

Reliability is to what extent the research findings replicated if another study is undertaken using the same research methods (Ritchie & Lewis, 2003). They asserted that “the reliability of the findings depends on the likely recurrence of the original data and the way they are interpreted” (Ritchie & Lewis). Measurements to enhance the reliability of the current research included all interviews recorded to present more reliable evidence and avoided any bias which might happen if the researcher attempted to remember the conversation. Gray (2004) asserted that “regarding reliability, it is fairly obvious that taped conversations will tend to present more reliable evidence than hastily written field notes.” Also, all the questions were worded clearly and asked in a natural tone of voice. If there were any misunderstanding the question would be repeated to enable the interviewee to understand what they wanted. Moreover, respondents gave equal opportunity to explain their beliefs and thoughts freely without any intervention either with comments or gestures, which would create bias in the interviewee’s response to the question asked. The study provides detailed information about the aim and objectives of the research, how the study and justifications of the adopted research strategy and methods.

### **3.10 Ethical considerations**

Introduction letters from the coordinator of MVP program were given to the researcher for Medical director Kiwoko Hospital to allow the researcher conduct his research study. During the study, the researcher promised participants that their confidentiality and privacy observed since the research involves stakeholders’ engagement participation and generating solutions to the existing challenges. The researcher made his intentions and actions explicit through dialogues with respondents (Students, hospital staff, community members). He (researcher) observed democratic values throughout the process. As supported by Winter(1996) (as cited in Denscombe, 2007) where he points out that when dealing with action research, the work must remain visible and open to suggestions, permission must be obtained before making observations and that the researcher must accept responsibility for maintaining confidentiality. I

also guaranteed ethical considerations by; acknowledging other people's work in the area of the research by ensuring in-text citation and referencing the respective sources at the end of the report. I avoided duplicating scholars, asked for permission from school authorities of KMLTS and each respondent to obtain information as well as to record our conversation during meetings. I endeavored to respect the request for anonymity of my respondents in my study

## **CHAPTER FOUR: PRESENTATION, INTERPRETATION AND ANALYSIS OF DATA**

### **4.0 Overview**

This study aimed at strengthening students' engagement in active participation to learn practical skills through work placements. An active participation was being employed and sustained as a method of teaching skills to medical laboratory trainees at KMLTS. The participants in this study as indicated in chapter one included; Tutors of medical technological, alumni, community members, and school administrators. Thus the information presented here is related to the implementation of active participation as a new approach adopted by stakeholders to enable learners to acquire practical skills. The data description and interpretation depended on action research cycle, which is a framework for diagnosing, implementing and evaluating a change process (Wehrick, 2009). Data has included results from researcher observations, students' responses and reflections upon the implementation of action points, and also incorporating views from other stakeholders that researcher interacted with during evaluation of action points. The presentation of the results of this research consecutively followed the objectives of this study as reflected in chapter one of this report.

#### **4.1 Intervention identified to enable students to retain practical skills**

To achieve this objective the researcher together with Stakeholders, adopted the following interventions; Demonstrating practical skills to students, allowing students to have self-practical study, obtaining new practicum site, gazetting practical content per semester, allocating time for practical from theories, students interpreting medical laboratory results, Student to be attached in HIV department for counselling, students to be placed in records for records management and pharmacy for stock management and designing sign post to depicting competencies skills. The description of how these implementable solutions were implemented is clearly indicated below. However, some interventions had been mirrored within other interventions.

#### **4.2 Implementation of interventions to engage students retain practical skills**

##### **4.2.1 Demonstration of practical to learners**

Demonstrating practical skills by all tutors to learners was believed by stakeholders as a means of empowering learners to do return demonstration and acquire different skills from their

seasoned experts/senior tutors. This approach to active participation to learn practical skills has enabled students to acquire practical experiences and share concepts as they emerge from the demonstrator. Then the demonstrator follows up of what students have learned in a given session of the particular standard operating procedure. Students usually develop self-esteem and responsibility for their own learning. This, in turn, assists learners to minimize the rote learning and halt them from becoming spectators of their own learning.

How it was planned: During future workshop meeting which was held on 20th of February 2016, the team of stakeholders and researcher recommended skills development teacher to draft a timetable showing time for skill demonstrations. Learners were divided into two groups each group with thirteen members. Students appreciated the use of grouping where they said it helps learners to know each other better and learn from one another. On 17th of June 2016, the timetable was made, all tutors and learners were given approved copies by the principal of KMLTS (appendix ii). Adding researchers voice to theirs ‘stakeholders’ Teaching small group is very significant in education because it provides an opportunity to share and test ideas with fellow students and examines different perspectives on learning issues. The stakeholders also agreed to set aside time for reflection, and discussion of group processes with learners for effective contribution and development of demonstration. Once again together with stakeholder, students were allowed to decide with a tutor on what to study whenever there is a demonstration.

How it was implemented: During group discussions and demonstration on the particular procedure, a task being was presented by a demonstrator ‘tutor’ and students were allowed to discuss and raise a number of ideas. The tutor would encourage them to always explain their points and ideas so that the rest of the group members can understand the context under which an idea was raised. This kind of explanation given by a particular student would activate other student’s minds to think about which we believed helped to make the detailed explanation of standard operating procedure afterwards.



**Figure 8. A Tutor demonstrating practical skills**

*Source. Researcher, 2016*



**Figure 9. Student doing return demonstration**

*Source. Researcher, 2016*

How it was monitored: Ideally, learning in the medical laboratory depends on evidence/hands on. During demonstration demonstrator record duration and the practical lesson of what had been having taught (appendix iii). The learners were allowed to observe what was taking place. After observation students were authorized to do return demonstration individually. The tutor was later allowed to give a brief feedback to learners. The demonstrator was mandated to spend enough time in practical room to enable students to make valid and reliable demonstrations following standard operation procedure. The students - demonstrator interaction gave an opportunity to discuss any issues arising from the process. The objective was to let the learners know what went well, what was less successful, productive and efficiency

#### **4.2.2 Promoted student Self-directed practical study**

In this study ‘self-directed or hands-on study’ perceived by stakeholders and researcher as learning in which learners guided by curriculum content, supported by tutors and learning environment in which students play an active role in their practical experience – either on their own or in collaboration with peers. However, during future workshop meeting as described in chapter one, stakeholders suggested maintenance of essential standards of the preconditions mention above for active practice of self-directed practical study.

How it was planned: At the institution under study ‘KMLTS’ there are good two actual resource centers that skill demonstration laboratory and hospital teaching Laboratory to support self – directed practical research. The plan for such centers was to allow students do their working practices independently, except hospital laboratory centers where the practice was by attachment or duty rota. Stakeholders together with a researcher at the meeting of the future workshop said:

*‘students can only reach their full study when they have the flexibility to study according to their needs, interests, and that classroom-based learning scenario are only a small part of the overall process of learning medical laboratory techniques’.*

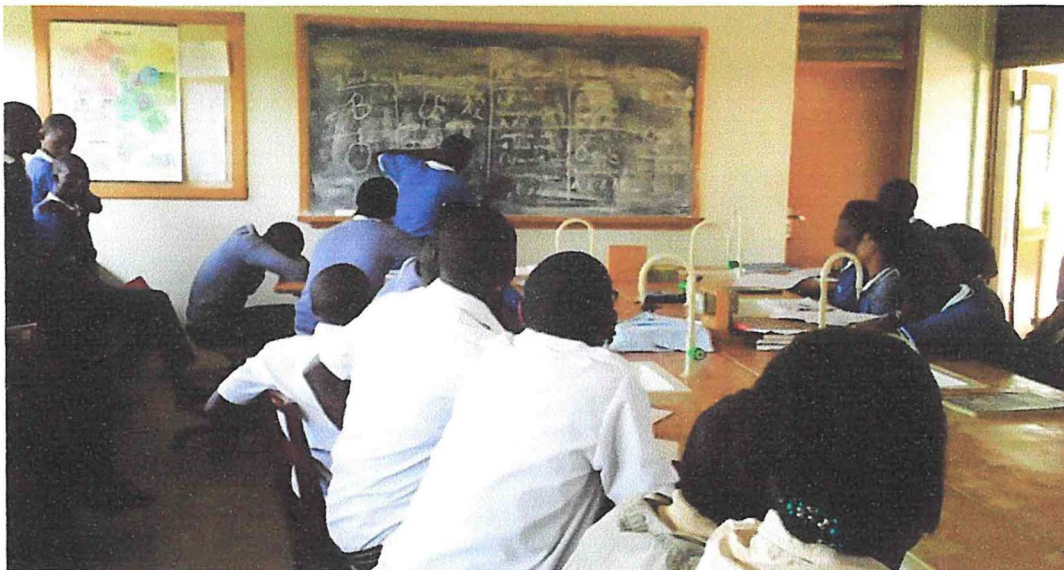
The staff teaching medical laboratory techniques and other stakeholders agreed to engage learners in their self-directed practical study, independent of their class work as set by their teachers. The self-directed study hour, stakeholders decided to reflect it on the teaching timetables (appendix vii)

One tutor committed that:

*“such good practical learning styles to medical laboratory techniques, learners regularly develop very helpful strategies which aid them make considerable progress in their skills; however, for every the independent practical study, there are many students who, regardless of their efforts, struggle to make meaningful progress due to lack of confidence in their research strategies”.*

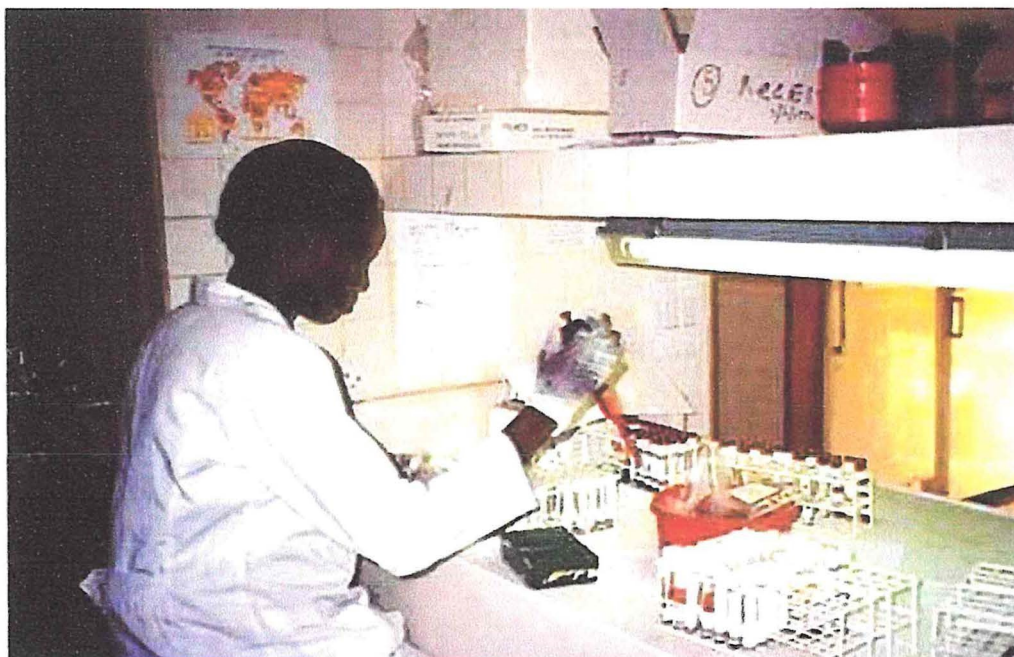
In such situation, Stakeholders and researcher agreed that tutors could help their students and develop skills needed.

How it was implemented: A stakeholder ‘Tutor’ manning skills demonstration laboratory drew a time table indicating self-directed practical study hours for learners (appendix ii). Later it was presented to all tutors, with no objection. Classroom coordinators received timetable; others displayed in the staff room and classrooms for else accessibility. Learners were allowed to work in groups organized by school management and their president of students association; each group had thirteen students and leaders (Chairman and Secretary; all selected by fellow students). The purpose of group leaders was to identify skills to study and requisitioning materials for use. In some situation, students were allowed to studying practical independently.



**Figure 10.**Group of students sharing practicals

**Source.** Researcher, 2016

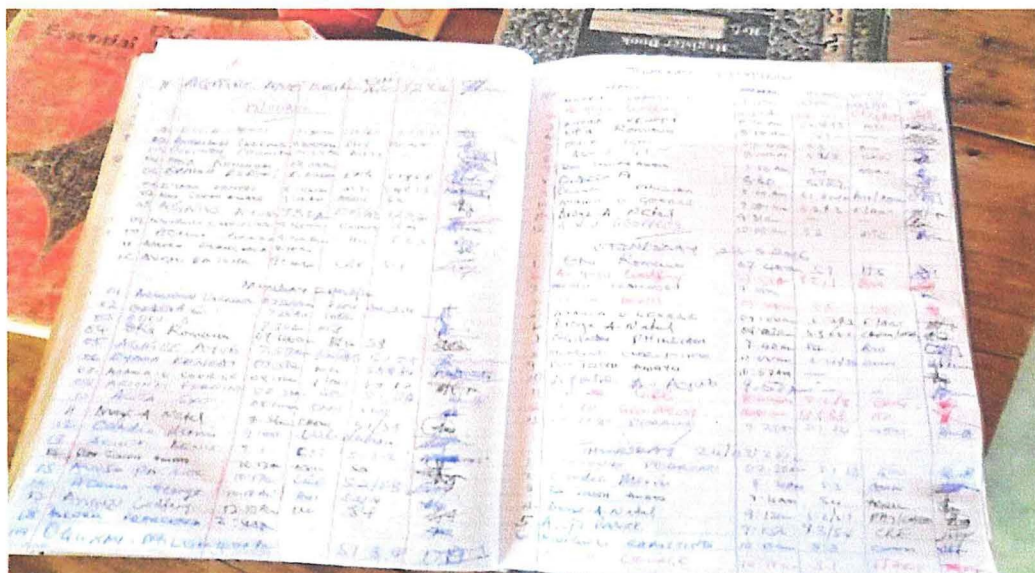


**Figure 11. Student studying practical independently**

**Source. Researcher, 2016**

During external hospital self-practical study for one month, learners wrote a report of what was covered and assessed by site supervisors. The practical report later defended at school in the presence of tutors and fellow students at the completion of their attachment, which is now taking place on every 20th of August of the academic year. Several records to confirm self-directed practical study kept which include; supervisors report (Appendix viii) and students' reports (see the extracted comments below).

How it was monitored: The researcher and stakeholders established learner's self-awareness and their awareness of the medical laboratory technology. They developed an idea of keeping detailed records of learning during hospital attachment as mentioned above. Richards and Lockhart (1996) suggests several ways of monitoring and reflecting on student's performance. Some of these methods include task observations and recordings. Students' attendance during the self-directed practical study in the school skills demonstration laboratory used. Learners who failed to record their work and register in attendance book were instructed to rewrite a report and repeat self-directed practical study. At the end of attachment site supervisor signed a confidential form (appendix ix) for each student and when pass mark is below 60%, the learner repeats attachment.



**Figure 12. Student's practical attendance registers**

Source. Researcher, 2016



**Figure 13. students preparing liquid soap**

Source. Researcher

#### **4.2.3 Signed MOU with rural partner hospital for practicum attachment**

The practicum attachment of the medical technology students were required to expose them to the environment of the clinical laboratory and hospital or independent laboratory. In this

way, the learner practices skills learned in the classroom setting and gain experience in the use of laboratory equipment, procedures, and practices. While in the clinical laboratory, the student work must always be supervised by site supervisor or technologist skilled in the performance of a test done.

How it was planned: Identification and selection of a new site for practicum attachment weren't a direct process for one day plan. The stakeholders agreed that there should be another practicum site due to increased number of students. They “stakeholders ” together with researcher sat and decided to add Kiboga district referral Hospital as their new site for attachment on 17th /July 2016. A draft MOU printed in conjugation with partner hospital.

How it was implemented: Principal Tutor was a signed responsibility of Memorandum of Understanding consultation with partner hospital. The aim of MOU was to agree on terms and condition for practicum attachment. On 15th /08/2016, the principal received transport and consultation fares for Kiboga Hospital. The medical superintendent, medical director and chief administrative officer together with researcher hold a meeting. Unfortunately, cameras were not allowed; the MOU assigned. Therefore on 20th August 2017 students will use this site for their one-month attachment. The signed MOU presented to stakeholders’ i.e. medical director, Human resource manager, Finance manager and school staff.

#### **4.2.4 Gazetted practical competencies for each semester**

How it was planned: Planning: Stakeholders sat on 27th/06/2016 to identify semester skills for each class. The skills extracted from log books which were bought by the school from Uganda allied health examination board on 14th of April 2016. Stakeholders agreed that practical competencies (appendix i were given to all students, tutors and displayed in the Hospital laboratory and classroom for ease implementation. The organization of practical skills was to enable learners to remain focused while in hospital attachment. There was a need for students to start attachment in HIV counseling, pharmacy, and records department.

How it was implemented: Each learner before attachment to the hospital receives practical learning objectives corresponding to competencies of the semester as enshrined in the competence Gazetted form (appendix vii) alongside actual log book. Each procedure performed well before site supervisor or senior laboratory technologists assigned. Throughout the whole

period of attachment, students kept these logs for supervisor's comments as a prerequisite for sitting national practical. For restricted areas like pharmacy, HIV and records a request letter for students attachment was written and recommended by deputy medical director(Appendix viii).

How it was monitored: Dialogue with the students during practicum attachment and giving feedback on students work was used as one approach to ensure learning through work placements. During supervision, students checked on what had been done, not done and why not done. Discussion with them later revealed that they did not know what to do because senior staffs do not allow them to perform sophisticated procedures without seasoned staff. They requested to perform some procedures in the school demonstration laboratory which took place on 25th/September 2016. Since intention for action research was to empower learners to keep track of their practices in their entire learning process the supervisor told them to do what they felt was vital to them. Learners kept records of attachments more especially in counseling, inventory and record management due to their restrictedness.

#### **4.2.5 Separated schedule for practical practice from theories**

It was necessary for stakeholders to recognize the importance of separating practical time from theory lessons. At Kiwoko laboratory school about 80% time of the day was spent on theories, this service to competence building. To some degree, the choice of the teaching in the school and learning outcomes completely depicted in the curriculum. However, the more learners stuck on the popular traditions of simple, practical work with their tendency to talk and write down the practical procedures without hands on, if no intervention received the more is likely to continue. Hence separating time for competence from theories is paramount important.

How it was Planned: According to the curriculum of medical laboratory technology, it was specified that learners need to get familiar to with the various medical laboratory equipment and different techniques in Biochemistry, Microbiology, Immunology, Laboratory Methods and Calculations, Pathology, Blood transfusion, Haematology, and serology. When we met for the first meeting on 25th of April 2016, we assigned the duty of drafting teaching timetable indicating the separation of theories from practical to skills development tutor (appendix iii). The school established a competence talking compound through erecting signposts with written inspirational words to remind learners about what mostly needed from a graduate of medical

laboratory technology. There was a change of hospital attachment shifts from usual five shifts (morning, day, afternoon evening and night) to four (morning, afternoon, evening and night).

How it was Implemented: On 29th of July, a form showing separated practically from theories form displayed in the staff room, which demonstrated that theories would only be taking 2weeks of each month. On 9th of September 2016, we meet to review and harmonize the progress with tutors and students. The two weeks of practical involves strictly hospital attachment, self- directed practical study, supervision and practical demonstration by tutors. Since the school tutors were not always there, the hospital teaching laboratory staffs were asked at the beginning of each semester always to assist and guide the students as they practice. Skills development tutor drafted hospital attachment duty rota with only four shifts which presented to both instructors and students. The duty rota was accepted and became operational on 3/5/2016(appendix ix).

How it was monitored: Monitoring: After every practice, the supervisor met students in the next practical lesson and each student was asked to share his/her experience and challenges during practice. The supervisor on duty took roll call, and absentees were are punished as stipulated in rules and regulations governing institution. Each practical week was assigned a supervisor whose function was to provide direction to students to observe and perform actions through support supervision. The guidance was very clear and unambiguous. The leadership was realistic and at a level suitable for the knowledge/skills base of the students. The students while doing practical carried their log books and gazetted competencies which used as an aide memoir.

### **4.3 Evaluation and impact of implemented interventions that enhanced skills acquisition**

#### **4.3.1 Demonstration of practical to learners**

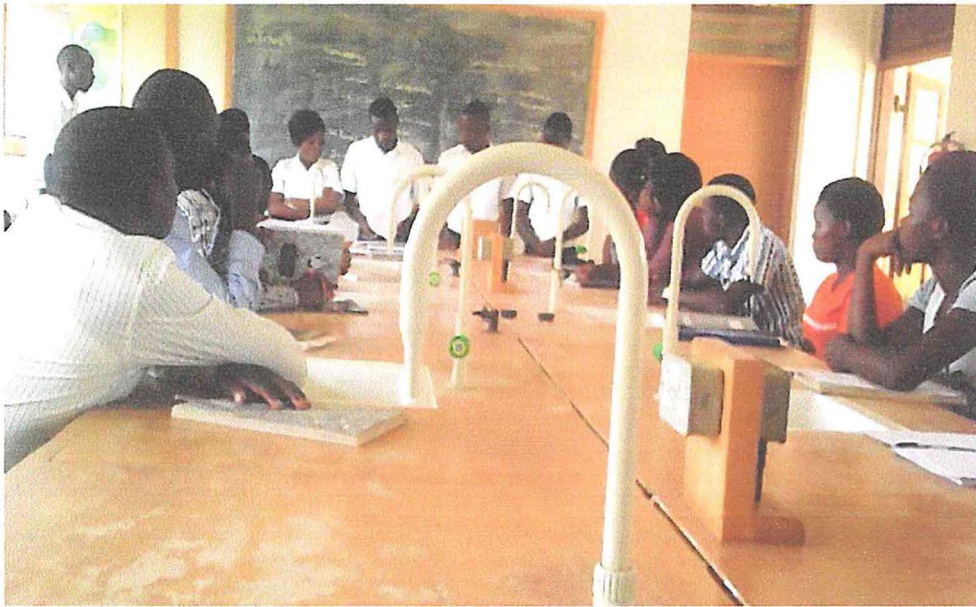
Before action research no tutor was demonstrating practical skills- the learners would get skills from hospital attachment and cramming standard operating produces (SOPS). A SOP is a set of step-by-step instructions compiled by a Laboratory in charge to help laboratory workers carry out routine procedures. The SOPs aim to achieve efficiency, quality output and uniformity of performance while reducing miscommunication and failure to comply with hospital regulations. With our active research, students are learning in groups of thirteen for practical skills. In one of the demonstration one student from year two said and I quote;

*Active participation to learn practical skills has made us reduce over dependency on our tutors thinking and, we are kept busy trying to interpret clinical laboratory reports for our own learning which will make us pass interviews for Job.*

The practical demonstration weeks are in black and white but alternating with two weeks theory per month (appendix xi).

#### **4.2.3 Promotion of students Self-directed practical study**

Before action research, there was no reports, no formal students groups, two weeks attachments, no report & oral presentation of external Hospital attachment report, no night, evening internal hospital attachment reports, and all practical within school skills demonstration laboratory done in the presence of a tutor. The process of evaluation took place once learners had completed an external self-directed study for one month (1st - 30th July 2016) while internal attachment was continuous. Students wrote reports and prepared for oral presentation which took place on 29th /08/2016. During the oral presentation, the evaluation depended on the comparison, in which learners compared their fundamental competence level before and after self-directed practical study. Currently, students are learning in groups, have an oral presentation of hospital laboratory night and evening reports in groups every day from 9.00am-11.00am, and Students communication skills and understanding of medical laboratory technology has improved significantly.



**Figure 14. Students presenting external Hosp. report**

**Source: Researcher, 2016**



**Figure 15. Students presenting night & evening report**

**Source: Researcher, 2016**

Students presenting external Hosp. reports Students presenting night & evening Hosp. report

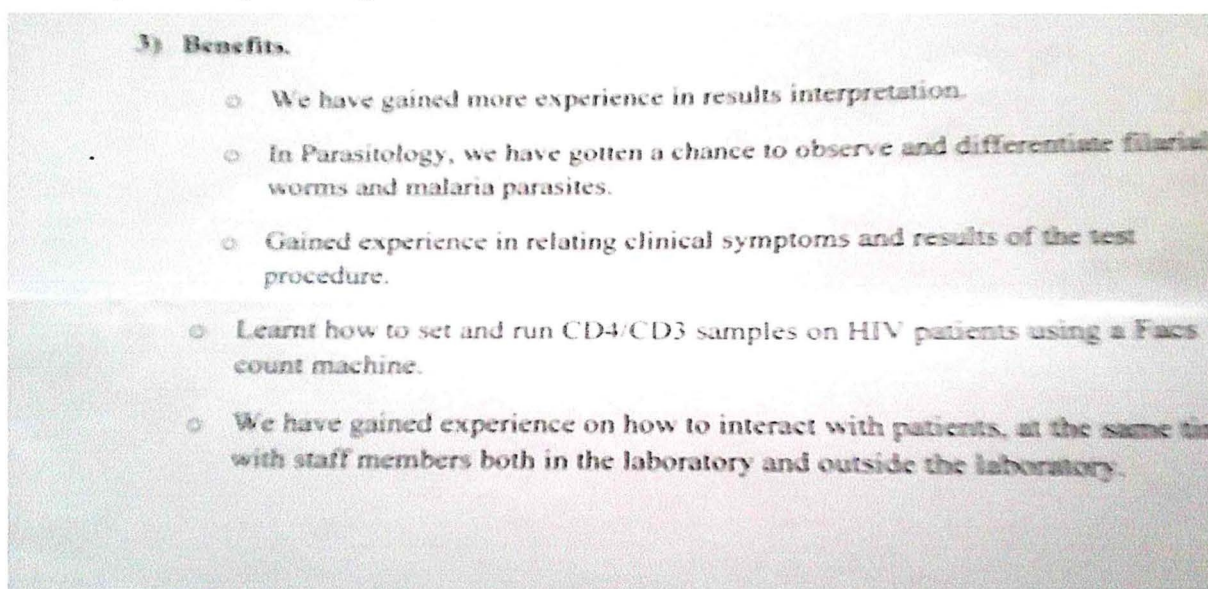
Below are comments from learner's oral presentation;

*I comprehensively enjoyed my study at Kiryandogo hospital district and now have valuable experience and skills for the world of work. I know this will help when looking for jobs and needing references. I feared it, in the beginning, but now I am so happy it was good. As much as the curriculum changes from theory to competence based training, I hope that hands-on training remains constant.*

*I think this attachment is a great opportunity for students to get ready for the real world and grow up. I think if answered this question before my attachment, I would ask, why do we have to do attachment at all, aren't hospital teaching laboratory enough? But now I know, Kiwoko hospital laboratories aren't enough, I got the first-hand experience in the 'real world.*

The Teacher's commented that:

*The self-directed practical study improves our interactions than teacher center, but some teachers felt they have no class time devoted to helping learners organize their education or lack confidence in their ability to do so. However, he suggested that such teachers may incorporate short discussion where students can reflect on and share their ideas and experience of learning*



**Figure 16. Student's comments on practicum attachment**

Source: students reports, 2016

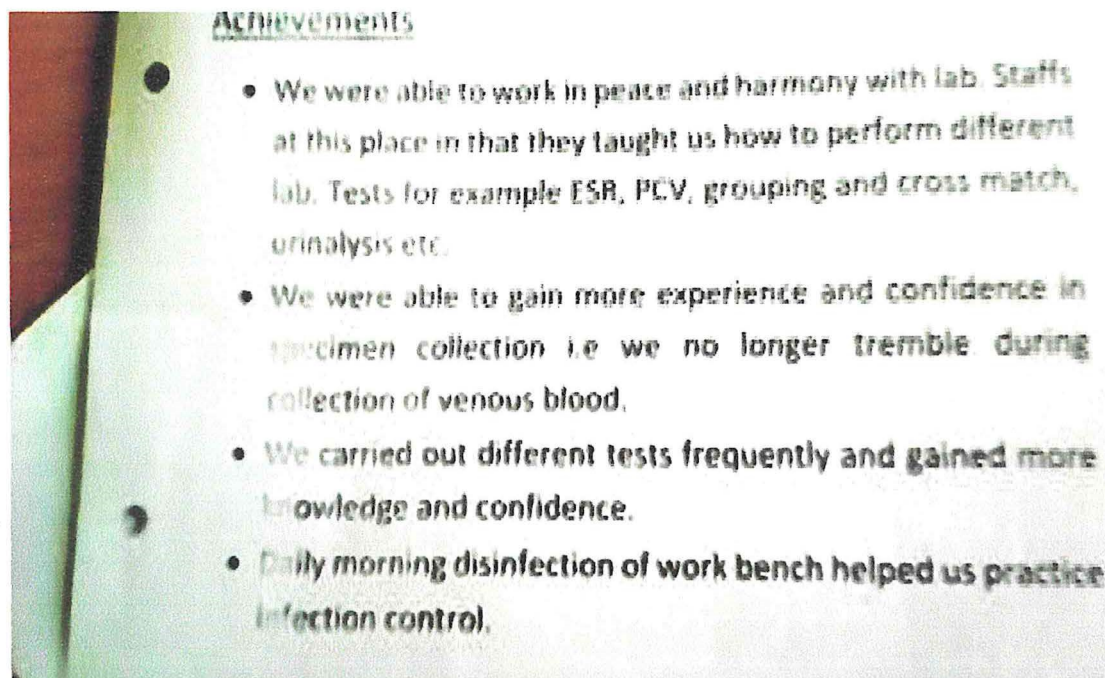


Figure 17. Students comments on practicum attachment

Source: students reports, 2016

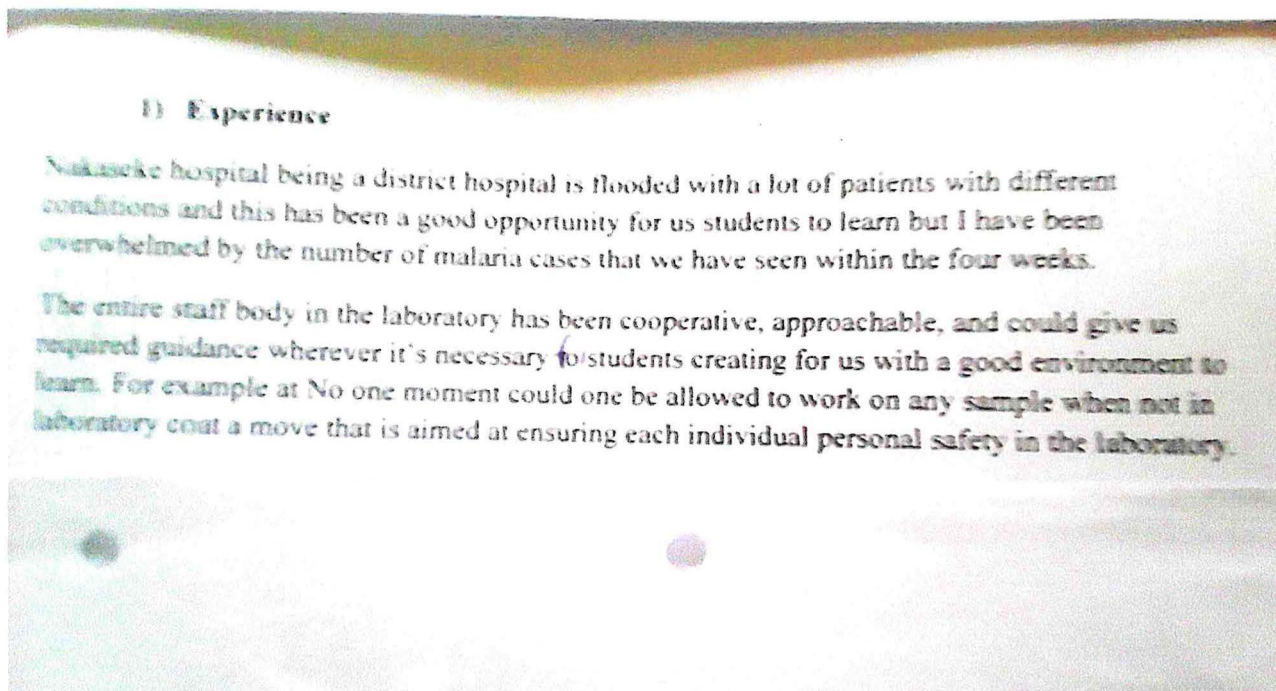
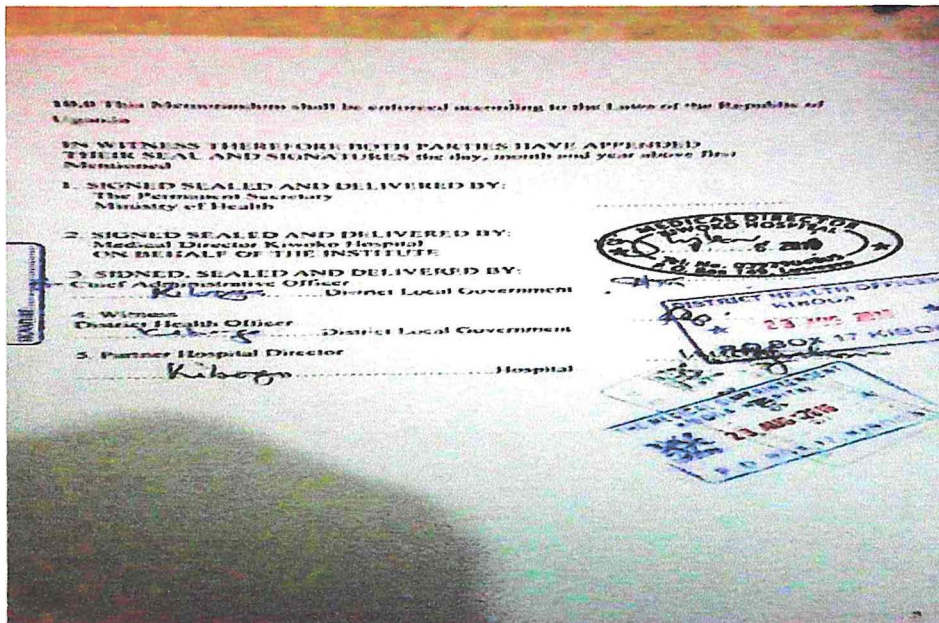


Figure 18. students comments on practicum attachment

Source: students reports, 2016

### 4.2.3 Signed MOU with rural partner hospital for practicum attachment

Before Kibago Hospital, KMLTS had two hospital attachments sites which would be too congested. During staff– students meeting held on 23/9/2016, members supported and welcomed Kiboga Hospital laboratory as their third practicum attachment site.



**Figure 19. Signed MOU with Kiboga Hospital**

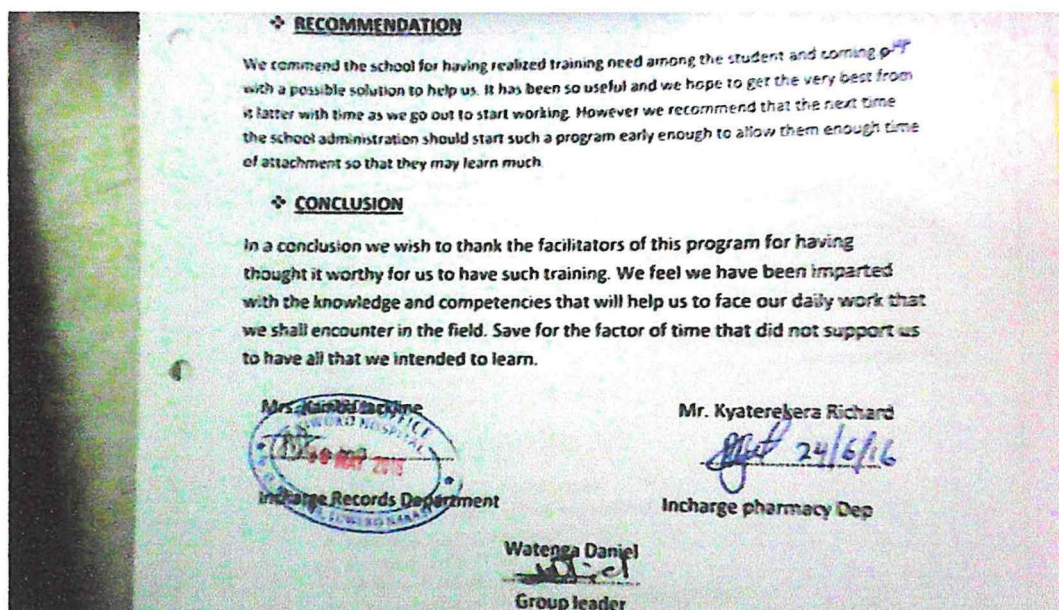
**Source: Researcher, 2016**

The MOU agreement kept in the school files. The new site identified and MOU signed; aim is to decongest students from previous attachments hence improving students' skills and space. The hospital laboratory is well equipped and with four medical laboratory technologists to train our students. The Laboratory 'Kiboga' receives approximately 150-200 patients for different diseases.

### 4.2.4 Gazetted practical competencies for each semester

Before Gazetting competencies students used to mix skills, could not know which competence to learn first and end. During practicum attachment, practical learning objectives were not semesterised which make them fail to synchronize capabilities. Learners restricted from acquiring HIV counseling, inventory, and store management skills because never reflected in the national practical competence log book. But during gazetting competencies, all limited

competencies from HIV department for pre & post counseling, records for store management and pharmacy for inventory management skills done. Currently, the practical log book signed whenever a competence is seen well done. Students have gained competencies in all areas of real life experience; now they provide pre & post counseling to HIV patients, balance stock cards, and inventory management. The attachment of learners in HIV, pharmacy, and records has always been earmarked to take place in the last semester of their training for one month as students complained two is the short period to acquiring competencies. The action of skills has given students to think ahead of time. One of the students in year two class noted in his report that the provisional practical competence helped to reduce the tendency of what he called “redundancy in the laboratory” by the students who are not creative and annotative. Below are achievements and comments extracted from their reports;



**Figure 20. Students comments on hospital pharmacy practicum attachment**

**Source. Students report, 2016**

#### **4.2.5 Separation of schedules for practical practices from theories**

From our experience and observation, the approach was helpful since learners who had not long been exposed to their located departments could afford to interpret generated medical laboratory results with notable improvements in the accuracy as time went on. This kind of learning was found to be fascinating. Students told me that they were happy because they could

now stay in the laboratory without interruption in the middle of performing a clinical procedure. KMLTS is a talking competence school. In their compound, there is a huge signpost describing a concept of elementary training medical laboratory students.



**Figure 21. Sign post in KMLT school compound describing curriculum for laboratory student**

Source. Researcher, 2016

One of the students interviewed on sign post commented thus and I quote;

*Throughout this certificate in medical laboratory techniques at Kiwoko medical laboratory training institute, my learning has been through engaging actively with the learning tasks as described on the sign post "75% hands on and 25% theory."*

The change of Hospital attachment shifts (from five to four) has improved students time /contact hours to clinical hospital laboratory procedures more especially rare processes like cerebral spinal fluid analysis. Senior technicians are signing students' logbook.

## **CHAPTER FIVE: CONCLUSION, DISCUSSION AND RECOMMENDATIONS**

### **5.0 Overview**

In this chapter, the researcher discussed implemented action points as presented in the section of this report following research objectives. This discussion has been dependent on my interpretation which based on my experience, observation and reflection upon the situation as it stretched out in the process of action research and also views from the stakeholders. It has been prudent to incorporate detailed views, theories, and concepts from various scholars to back up the discussion. It is in this chapter that we have made our conclusion based on our experience acquired through this action research process and the recommendations which have outlined the way forward of this action research.

### **5.1 Conclusion**

In this segment of chapter five, I present the conclusion and recommendations based on the discussion presented above. In this action research study, we set to identify factor affecting skills acquisition, intervention measures, and implementation and evaluate the impact of intervention measures. The fifty key stakeholders participated in the study.

The study has shown that the tutors are now knowledgeable on demonstration method of teaching and learning. Tutors now involve students in presentations/tutorials. Their promotion of individualized /independent study and improved instructor practical demonstration. Students can interpret medical laboratory results. There has been a tremendous change in teaching timetable to strengthen students engagement to learn practical learning e.g. Group study, discussion, demonstrations, independent study, supervisor, documentation and hospital attachment (Two weeks per months). There is a remarkable academic achievement in practical subjects as compared to the academic subjects as evidenced in the last received Uganda allied examination board results. The school has adopted a student-centered approach to producing better practical results.

### **5.2 Discussions of the interventions Implemented**

Under this objective, the stakeholders were democratically acceptable to participate in Identification of possible solutions to strengthen students' engagement in learning. The Implementable Solutions which I am going to discuss are based on the stakeholder's views and

from my observation and interpretation of the implementation and evaluation process of action points which we considered as critical issues as they had a direct bearing on the hands on the training process.

### **5.2.1 Demonstration of practical to students**

The current study sought to strengthen students work based learning using demonstrations in classroom and skills laboratory. According to Killen (2007), the demonstration is a teaching method based predominantly on the modeling of knowledge and skills. From my experience, this form of instruction is whereby the demonstrators or learners show how the equipment works or how something operates. For example, a teacher demonstrates how to use a microscope, how to operate a centrifuge, how to stain tissues, or what happens when water added to an acid. Following that, students practice under supervisor. Finally, the independent practice perfectly is done to the point of proficiency. According to Dun (2008), this teaching method is slightly more active than a lecture because the learners can get involved and see first- hand how the constructor phenomena present itself in the real word. Also, demonstrations can break up the pace of the classroom while also provide an enjoyable experience for students (Forsyth, 2003).

I was t has also been advocated by chiKuni (2003) that there are two types of demonstrations namely the step by step by step and the whole process demonstration. In the entire process demonstration, the teacher demonstrates the full process from the beginning to the end without interruption by learners (Chikuni 2003). For Gwarinda (2013) the step by step demonstration is done stage by stage with the teacher explaining each action as the operation proceeds. The school of medical laboratory and her stakeholders emphasizes step by step or stage by stage of demonstration as more convenience teaching method that imparts skills to learners. As Mc Keachie (1986) theorists as cited by Chingombe (2013), suggests a spot demonstrations, usually done after the demonstrator identifies a problem or a mistake made by the learner but done after showing the procedure. For Petty (2004), if the teacher spots a problem, the student will then be stopped and the teacher will re-demonstrate the skill this aims at preventing worsening of the problem.

In a nutshell, therefore, demonstration have promoted teamwork skills because practicals conducted in groups, where learners can learn collaboratively. The working together has appreciated the value of working with their fellow students and insight into the skills needed for

doing this effectively. The co-operative activities which had used during a demonstration to promote 'teamwork skill' include checking observations, sharing reports, experiments/ procedures, laboratory results interpretation and compiling group reports.

### 5.2.2 Self-directed practical study

Self-study was one of the weighty issues during future workshop model as indicated in chapter one and the practice of medical education. According to Samaras (2006), self-study is a component of reflection in which learners systematically and critically analyze their actions and the context of those actions as a way of developing a more consciously driven mode of professional activity. For Beck, Freese and Kosnik (2004) describes self-study as an inquiry-oriented approach that is personal, reflective, collaborative and constructivist. This is in line with Killen (2006) who observed that learning is not just a passive process of directly receiving information; rather it involves deliberate progressive construction and deepening of meaning. From my experience self-study is constructivist because it includes an element of the ongoing inquiry, respect, personal experience, and emphasizes the role of knowledge construction.

In medical, educational trend, the term 'self-study' is often used along with a variety of educational concepts such as lifelong learning, self-directed learning, continuous medical education, active /independent learning and student-centred education e.t.c. During self-study, the school is carefully considering its educational programs and services with particular attention to student self-study learning and achievements. The self-study process must be meaningful and useful about competence training curriculum of medical laboratory technicians and learners have to procedure evidence of compliance. Further supported by Mjelde (2006) who argues that learning does not refer to like anything that happens inside a learner's head when he/she listens to a teacher or reads a book but should be known as to be fundamentally interactive. Mjelde notes that learning is the internalization of the schemata which incorporate cognition, perception, and action. And that these schemata are made meaningful by jointly carrying out activities by an expert (teacher or trainer) in such a way that the learner gradually masters more different parts of the task successfully until he/she can be able to take over more multiple stages without the needs an expert to assist him/her. Must be meaningful and useful about competence training curriculum of medical laboratory technicians and learners have to procedure evidence of compliance. Further supported by Mjelde (2006) who argues that learning does not refer to like anything that happens inside a learner's head when he/she listens to a teacher or reads a book but should be

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As teachers of learners, we took on reflection on a daily basis, what went well, what did not, what changes and we can improve students' practical self -study. As a teacher, we encourage our students to reflect on and evaluate their independent learning because reflection acts a critical component of learner's professional growth. As supported by Diana Laufenberg ( 2012) who says that 'education should not be looked at as if it's about to come to school to get information and not experiential learning, empowering student's voice and embracing failure, we are missing point''. Thus through constant encouragement and guidance during self – study learning by their teachers and senior staff by allowing them to learn by doing we observed some improvement in handling standard operating procedure and laboratory results interpretation. The self-directed practical study has improved cognitive skills among the learners. This is through carrying out laboratory experiments hence developing skills in problem solving and analysis, explaining results and predicting results by mere looking at the texture of the specimen. Due to self – directed practical study again learners had been trained in aspects of making products (Liquid soap) and avoiding systematic and random errors in the laboratory.

### **5.2.3 Obtaining new practicum site**

A practicum is a practice –based opportunity for learners to integrate and apply skills and training learned through coursework and prior experience in a professional public health work environment GMC (2011). The practicum is required for all medical laboratory students and typically is 720-800 hours duration. Public health work environment includes private not for profit Hospitals, local government health centers, and private Health centers. Once a new site has been identified there was a need for the school to request the partner hospital laboratory manager to identify a preceptor or site supervisor. The practicum site is required to expose the learners to the environment of clinical hospital laboratory or independent laboratory. In this way, the student may practice skills learned in the classroom setting and gain experience in the use of laboratory equipment, procedures, and practices.

According to Jane (2009), a preceptor is an on-site supervisor that manages the practicum experience a student. From my observation and expertise, this individual helps to mentor, supervise and direct the student's practicum experience. Jane also argues that preceptor is not a faculty member and cannot be remote to the location of the practicum. She 'Jane' continues to demonstrate that some practicum site may have specific requirements such as a background check (e.g. government clearance or memorandum of understanding (MOU) with the partnership. This explained why at Kiboga Hospital 'New practicum site' there was signing and stamping of MOU as a prerequisite for students attachment.

A practicum made a mandate by all accredited school of medical education. According to Uganda allied professional council all medical professional must develop Skills in basic medical, public health concepts and demonstrates the application of these concepts through a practice experience that is relevant to the student's areas of specialization'' (UAHPC, 2010). Therefore medical schools must provide opportunities for learners to apply knowledge and skills acquired through their courses of study.

A practical knowledge and skills acquired from the site of practicum attachments are essential to successful practice. Furthermore, these practice experience gained from practicum attachments must be well planned, supervised and evaluated as there a critical component of a medical laboratory program. These opportunities can take place in a variety of organizations or agencies but should include mainly referral hospitals and referral diagnostic centers to the extent possible and appropriate. According to Illing et al. (2008), the Practical experience is supervision by a qualified preceptor (site supervisor) who is a medical laboratory technologist. Therefore for efficient attachment, the school must have clear learning objectives, procedures, and criteria for evaluation of the practicum.

#### **5.2.4 Gazetting competencies for each semester**

Once medical laboratory students master the skills, they require to enter the workforce, appropriate treatment and diagnosis successfully are reached by the doctor hence a reduction in spreading diseases and in drug resistant. The key to making students successful in their work is to provide practical training tailored to employer requirements (stern, 2006). The focus of all medical laboratory personnel is the patient. As health care providers, they should strive to ensure that the safety of our patient not comprised in any way by the actions of the learners.

The school under study usually carries individualized competency testing for non-specified skills/competence that are assured to have been covered either at school level or during external practicum attachment. There is a need to subject students to competency testing for specific skills that is assumed for learners to possess within a particular semester. Further supported by Cochran, (2001) who argued that Competency testing presents a method of assuring the employees that the clinical medical laboratory learners from the medical institution are competent and safe to perform procedures and techniques with patients. From my experience, competency tests for gazetted skills should take place before the practical exam in each semester so that a minimal level of competence established before the start of the medical laboratory education component for that six months.

According to Biggs (2003), the desired learning impact of a process of learning is formulated by the teaching staff, preferably involving student representatives in the process, by internal and external stakeholders. According to Clark (2011) who notes that competencies are obtained or developed during learning by the students/learners. From my experience and observation skill or skills is what a student does not what a teacher does. The proponents of competence-based medical laboratory education favor teaching organized around skills or abilities over long lists of knowledge objectives (Carraccio et al., 2008). It's argued that the reductionism (analysis of complex things into simpler constituents) of goals –based method has led to an over-stress on knowledge at the expense of skills and attitude. According to Aggarwa et al., (2007), skills required by medical laboratory graduates are acquired from educational needs assessment such as practice profiling, task analysis, defining population health needs, or identifying entrust able professional activities for specialty or sub-speciality. Aggarwal continues to argue that determined abilities be organized as competencies for a learning purpose. Therefore medical institute Kiwoko worked backward to identify skills that learners need to achieve their required competencies. The instructional methods and assessment tool in place have facilitated the development of students for these skills in medical laboratory technology.

The development of students' skills of diagnosis through practical is characteristic of a mindset for both students and tutors. Traditionally such practical used to provide settings in which students crammed procedures. Since the introduction of semesterised competencies learners' performance in practical has tremendously improved. In the last concluded exams out of forty students, thirty-two had A+ (85-100%) (Appendix viii). Students are confident where

ever they work (private and public Hospitals). Gazetting competencies has enabled students to develop their technical, observational and motor skills because they are now familiar with laboratory equipment, basic practical skills, laboratory results interruption and writing reports.

#### **5.2.5 Separating schedule for practical from theories**

Time is a vital resource for all individual action. Teaching and learning also take place within the boundaries of time. According to Entwistle & Smith (2002), a too high education does not facilitate effective learning but leads in learners overwork and superficial studying. Learning takes place in student's organized time and learning activities. If there is no time to undertake learning activities, it is impossible to study. If a learner does not spend any time for independent learning, studying can take place only during contact teaching hours. The worst time for student's a potential for learning is when learning hours are interrupted (Badaranayake, 2000). This is further supported by Johnson & Johnson as cited by Kyarizi (2012) where they pointed out that having students to practice a skill once or twice or for a short time is not enough. They continued to argue that great teachers need to keep emphasizing an ability until students have integrated it into their behavioral repertoires and able to do it automatically and habitually. According to Leigh (2010), a student with a great teacher can achieve in half a year what a learner with a poor teacher can achieve in a full year. It is reported that high-performing institutions around the world have intensive professional learning programs in their schools.

Although study time determination at Kiwoko medical laboratory school, students' actual use of time be monitored on a daily basis. Further supported by Lizzio (2002) who argues that a tutor can monitor students' use of time by making inquiries and asking them to keep time diaries while learning outcomes may be evaluated by use of self-evaluated tools such as portfolios, rubrics, summative tests and authentic tests or problem solving.

Separation of schedule for practical from theory has consolidated scientific knowledge and practical. Illustrating knowledge without practical can be highly complex and abstract. But ever since practical took one 2weeks uninterrupted, practical have been simplified because students have enough time to complete study procedure. There has been an improvement in understanding of medical laboratory procedures due to increased time of tutors to teach practical, useful illustrations of materials taught in lectures, stimulating environment, attachment to HIV, pharmacy, and records (restricted department) and improved communication skills.

### 5.3 Recommendations

From the above discussions and conclusion, I felt, therefore, to recommend the following under subheading of the implemented intervention measures of chapter four.

There should be carefully planning for a tutor to demonstrate properly at it is with any teaching strategy. Teachers should be allowed to rehearse the demonstration before carrying out in the classroom. If breakable equipment or dangerous chemicals involved, the tutor will need to alert the learners to take precautions before starting to work.

The self-study must include in some manner a review of students learning outcomes and assessment of the outcome. For effective self-study, there shouldn't be a lack of study materials at the institution level.

The new practicum site should have site supervisor/preceptors. The site supervisor will liaise between the school and work site, providing supervision to the student. Often, they will serve in a mentoring role, providing the students with valuable guidance, insights and lessons that can only glean from years of professional experience.

The importance of impacting generic competencies to learners is now widely understood, but an understanding of the concept alone is insufficient. The original recommendation lies in the implications a competence-based approach has for teaching and learning at the institution. In other words, the school should adopt appropriate modes of instruction which can foster competencies regarding knowledge, understanding and skills; and how to assess these skills. The following set of teaching techniques can significantly improve teaching: Seminar (small group teaching), Tutorials, Exercise classes or courses, Workshops (classroom based practical classes), Problem-solving sessions, Demonstration classes, Placement (internship/traineeship), Work-based practice and study visits/Fieldwork.

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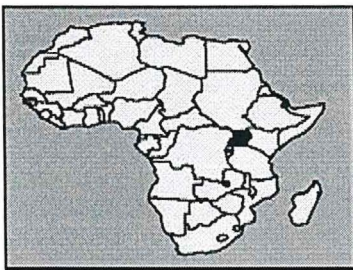
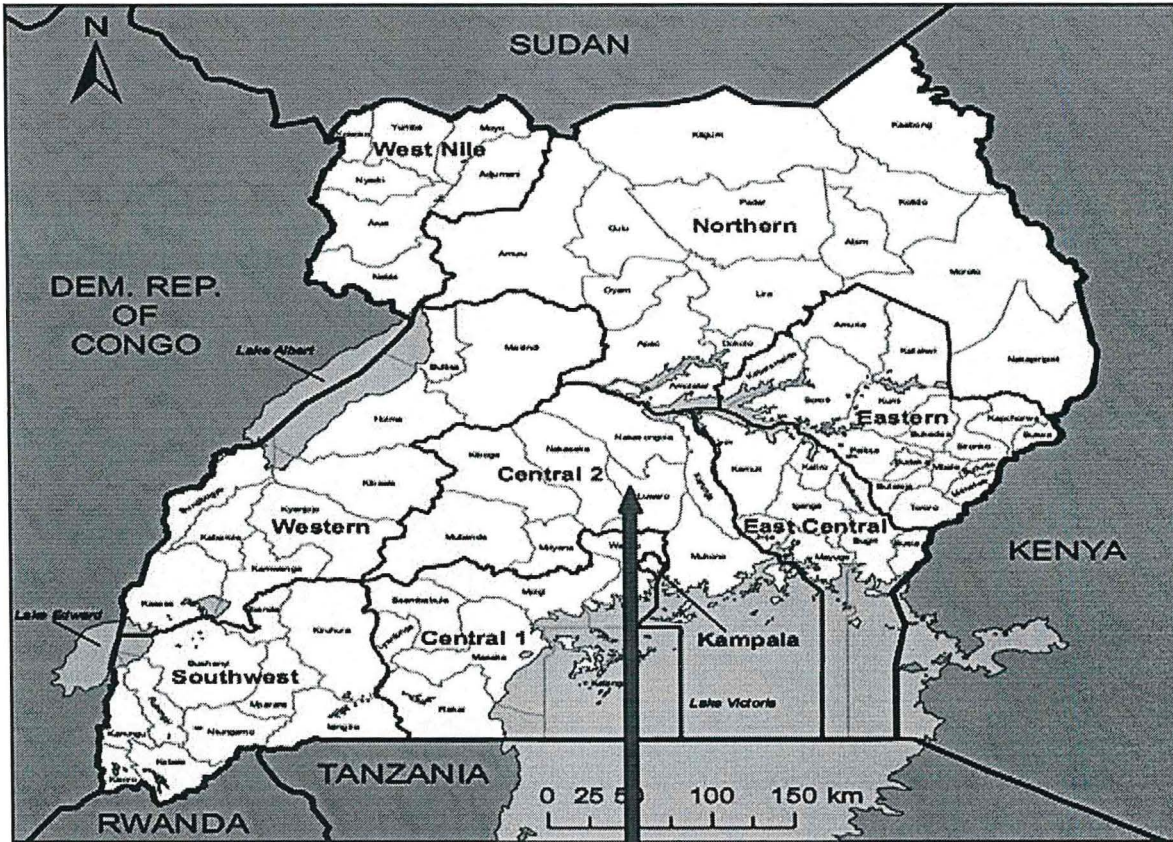
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APPENDICES

Appendix I: Map of Uganda showing Nakaseke district of the student area

**UGANDA**



Nakaseke District

## Appendix II: Duties/tasks and competencies for each work process

Work process	Task	Competence
<b>1. CBET – curriculum implementation</b>	<ul style="list-style-type: none"> <li>• Increase access and improve on the quality of skills training in the institution.</li> <li>• Demarcate the scope of technical skills and responsibilities required to be performed and therefore trained for this specific cadre.</li> <li>• Provide skills supported by scientific knowledge which is required in the world of work</li> <li>• Enable learners acquire scientific knowledge and skills that will enable them to solve routine and general laboratory assignments required in the health sector</li> </ul>	<ul style="list-style-type: none"> <li>• Record management skills</li> <li>• Good planning skills</li> </ul>
<b>2. Skill demonstration in school laboratory</b>	<ul style="list-style-type: none"> <li>• Interprets Standard operation procedure manual</li> <li>• Preparing work schedules</li> <li>• Preparing reagents</li> <li>• Organizing equipment and sundries</li> <li>• Preparing specimen containers and collects specimens</li> <li>• Demonstrate safe laboratory practices</li> <li>• Stores and transports specimens</li> </ul>	<ul style="list-style-type: none"> <li>• Safety protection skills</li> <li>• Store management skills</li> <li>• First Aid skills</li> <li>• Perform Phlebotomy</li> <li>• Prepares reagents</li> </ul>
<b>4. Practicum attachment (Kinyandogo, Nakaseke Hospitals...)</b>	<ul style="list-style-type: none"> <li>• Preparing stains, reagents and culture media</li> <li>• Collects and transports specimens</li> <li>• Operates instruments and equipment</li> <li>• Process specimens</li> <li>• Booking</li> <li>• Select group leaders</li> <li>• Participation in community outreach activities</li> <li>• Organize means of transport</li> <li>• Prepare laboratory materials to use</li> </ul>	<ul style="list-style-type: none"> <li>• Analyse clinical specimens</li> <li>• Observe infection control procedures</li> <li>• Interpret result</li> <li>• Trouble shoots in laboratory equipment</li> <li>• Professional ethics</li> </ul>
<b>5. Study Tour</b>	<ul style="list-style-type: none"> <li>• Compile and analyze data</li> <li>• Booking ( Nakasero blood bank, Uganda virus research institute, T.B Laboratory, Buluba –leprosy, Kasangati public health laboratory and Joint clinical research council</li> <li>• Organize transport means</li> <li>• Prepare practical related objective to cover</li> </ul>	<ul style="list-style-type: none"> <li>• Report writing</li> <li>• Time management</li> <li>• Communication skills</li> </ul>
<b>6. Competence assessment</b>	<ul style="list-style-type: none"> <li>• Preparing materials</li> <li>• Students registration for exams</li> <li>• Collect log books.</li> <li>• Invigilation of exams</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate skills</li> <li>• Observe professional ethics</li> <li>• Passes practical exams</li> </ul>
<b>7. Certification /qualification</b>	<ul style="list-style-type: none"> <li>• Preparation and publishing of qualified graduands list</li> <li>• Invitation of guests</li> <li>• Venue organization</li> <li>• Award of certificates</li> </ul>	<ul style="list-style-type: none"> <li>• Public management and administration skills</li> <li>• ICT- skills</li> </ul>

### Appendix III: Challenges affecting skills acquisition at KMLTS

Much time spends in theory than practical and inadequate monitoring of students during attachment
There is Congestion of students during Hospital Laboratory students' attachment.
Lack of reflective log books for first years to record their practical experiences.
Some valuable information were not in the curriculum
Students are not allowed to practice practicals individually alone. i.e Teacher –centred learning.
No gender sensitivity when placing students to external practicum attachments
Inadequate monitoring of students during attachments in hospital laboratory
There is lack of skill assessment policy for students and No MOU'S
Insufficient time allocated for students to practice in the Hospital Laboratory
Students were dodging duties because of less time allotted for practice.
Students at practicum sites, especially Kiwoko Hospital Laboratory, avoid working in some departments like microbiology to prepare sputum.
Stagnation of students in one department for example blood bank
Insufficient time to teach practical
No access to internet in school, the one in Hospital Medical laboratory some staff refuse to disclose password to students
We study many parasites, but we see very few practically
There is contradiction of standard operational produce(S.O.P) we study in school and Hospital S.O.P
Duty rota for practical skills in hospital laboratory attachment usually collides with classroom teaching; teaching practical is tutor centered
We spend much time in theory than practical
Insufficient staff to teach practical
The tests carried out are not reflected in CBET curriculum
Strict laboratory rules for not allowing students on off duty to appear in Laboratory
Denied opportunity to practice practical in Hospital medical laboratory even on themselves for phlebotomy
School demonstration lab is too small to accommodate students during practical sessions
Use of demonstration lab as classroom for teaching theories
Delay in signing the logbooks
Teaching practical is tutor centered
Duty Rota for practical skill in Hospital Laboratory attachment usually collides with classroom teaching.
Senior students denied chance to perform some like renal function tests ( RFT'S) and Liver functional tests(LFT'S)
Poor motivation of students by the hospital
Sufficient manual methods during training than automated methods
Inadequate tests at the practicum sites than what students study
Inadequate supply of reagent at practicum sites
During internship attachment, staff dodges duties since students are ever in laboratory
Procedures taught in the class aren't matching with what was in the world work
Time spend at study visit sites is very short.
Attitude of staff towards students is not okay
Some staff is not willing to teach students
No time allocated to allow students practice on their own
The Hospital staff knowledge to some tests is limited
Students don't know phlebotomy

#### Appendix IV: Utopian solutions without any barrier, limitations or restrictions

Laboratory results in interpretation round table
Expanding the existing skills laboratory
There should be student assessment policy
Allocate specific period for theories and practical
Students should visit all study sites indicated in their circular
Female students should also go for research attachment outside Kiwoko Hospital in next attachment
In-charge should supervise staff on night duties at least two in a week
Students need to have counseling skills in laboratory management course unit.
Erecting a Signpost showing concept of training a lab. students
School need to buy more books( for entrepreneurship and clinical chemistry)
there should be improvement of Students exposure to ICT
For good practical experience, we need only four shifts i.e. Morning (7 am to 1 pm), afternoon (1 pm to 5-pm), Evening (5 pm- 9 pm), and Night (9 pm – 7 am).
Certain months should be spared for practicum attachment only
There should always be meetings between staff and students this removes gap between students and staff
School teams need to supervise students during Hospital attachments.
Students never to move with S.O.PS' Whenever they go for attachment
School should have visual aids during learning and teaching process
School should motivate Hospital staff by allocating some practical skills for demonstration to hospital staff, parties, Luncheon, etc.
Continuous of medical education (CMES') between Hospital staff, students and tutors to harmonize some effective procedures.
Regular meetings with Hospital staff, Tutor, and students at least once in a month.
Sites for practicum attachment should be well equipped
There is a need to have practical mentor in the laboratory but not all the tutors need to go there
student-centered study practical should be implemented
Improve on motivation of students for night duties i.e. 500/= to 1000/=, two spoons of sugar per student to 1kg of sugar per student for one month
student should-should show committed to reasons why they have gone to the practicum sites.
Students should receive practical content to cover while at internship site
Students should know the staff they are working within each department
During attachment, students should go to the practicum sites which are full automated, and with MOU
Students should respect staff
There should be CME'S and demonstration on femoral tapping
Students should be involved in specimen collection from admitted patients like Lumbar puncture for cerebral spine fluid
Different Tutors should demonstrate practical skills
There should be self- directed study for practical

### Appendix v: implementable Solutions identified by stakeholders

Different tutors should demonstrate practical skills to students.
There should be a timetable for self-study of practical in the afternoon by students.
School should obtain MOU's for New practicum sites
Students to be guided by practical content to cover while at internship site
There should be an attachment of second years to pharmacy and recorders department.
Allocate specific period for theories and practical.
Female students should be allowed to go for practicum attachment outside Kiwoko Hospital in next attachment
The school should display the concept of Basic Training for Medical laboratory in the school compound.
There should be time allocated to interpret laboratory report.
Students need to have pre and post-test HIV counseling skills.
For good practical experience, we need only four shifts i.e. Morning (7 am to 1 pm), afternoon (1 pm to 5 pm), Evening (5 pm- 9 pm), and Night (9 pm – 7 am).
School staffs need to supervise students during Hospital attachments.
CMES' between Hospital staff, students and tutors to harmonize some practical procedures.
Regular meetings with Laboratory staff, Tutor, and students at least once in a month.

## Appendix VI: Supervisors report during external attachment

KIWOKO MEDICAL LABORATORY TRAINING SCHOOL

PRACTICUM SUPERVISION GUIDE

ACADEMIC YEAR 2015/2016

### 1. TESTS CARRIED OUT AT THE SITE:

- i. med
- ii. HbA1c
- iii. Blood count
- iv. Urine count
- v. Urine microscopy
- vi. Urine analysis
- vii. Hematology
- viii. HbA1c, HbA1c, HbA1c
- ix. CD4 cell count
- x. HSA pregnancy test

### 2. EXTRA ACTIVITIES STUDENTS WERE INVOLVED IN:

- i. Dispensing drugs
- ii. Counselling and guidance
- iii. Health education
- iv. Involving in referral activities
- v.

### 3. CHALLENGES BEING FACED DURING ATTACHMENT:

- i. Space for working is
- ii. Few tests
- iii. Stock out for some reagents and standards
- iv.
- v.

### 4. SOLUTIONS TO THE CHALLENGES FACED:

- i. Space was used to improve
- ii. Some other space e.g. for photography
- iii. They would continue buying other
- iv. tests which they thought should help
- v. the patient

### 5. RECOMMENDATIONS:

- i. They should inform clinicians to start
- ii. writing clinical notes and even
- iii. ask for other tests vital for the patients
- iv. not quite net in this because
- v. kids have been presenting with mal

### PART B. INCHARGE'S RESPONSE

1. How are students practicing professional dressing code of conduct before the staff and other clients within the hospital?

They have always practiced a professional code of conduct

**Appendix VII: Site supervisor's confidential form**

Kiwoko medical laboratory training school  
 P.O. Box 149, Luwero, Uganda  
 Tel: 0782591013 (Principal)  
 0775448554 (Academic Registrar)  
 0302 002077 (Office)  
 email: labprincipal@kiwoko-hospital.org



**CONFIDENTIAL FORM**

(We request you to fill this form in the last week of attachment most probably on 25<sup>th</sup> & 28<sup>th</sup> July 2016 by immediate supervisor and laboratory in charge)

Name of the student BEGIRAYO NATHAN Hospital of attachment KIRYANDONGO P. HOSP

**Section A (be filled by immediate supervisor)**

CHARACTERISTICS	SCORE	Remarks
Punctuality/Time management	85	V. Good
Aptitude(interest, zeal and willingness)	86	V. Good
Record management(use of records, record keeping)	65	Good
Laboratory safety(protective gear, hazards and proper use of materials)	90	V. Good
Instrumentation(equipment use, care and maintenance)	75	Good
Professional code of conduct	80	V. Good
Proficiency & competence in analysing samples	83	V. Good
Extra activities that a student was involved in	85	V. Good
Average score	81	V. Good

Grading: Very good = 80-100%, Good = 65-79%, Fair = 50-64%, Poor = 0-49%

Area of improvement of the student He need more hands on in preparation of reagents

Name of immediate supervisor Kelufu C. Sign [Signature] and date

**Section B (be filled by laboratory In-charge)**

General comment on continuity of the practicum attachment for Kiwoko hospital laboratory students Well learned a fine lesson but need more input in microscopy courses

Name of in charge Kelufu C. Gajjan Stamp

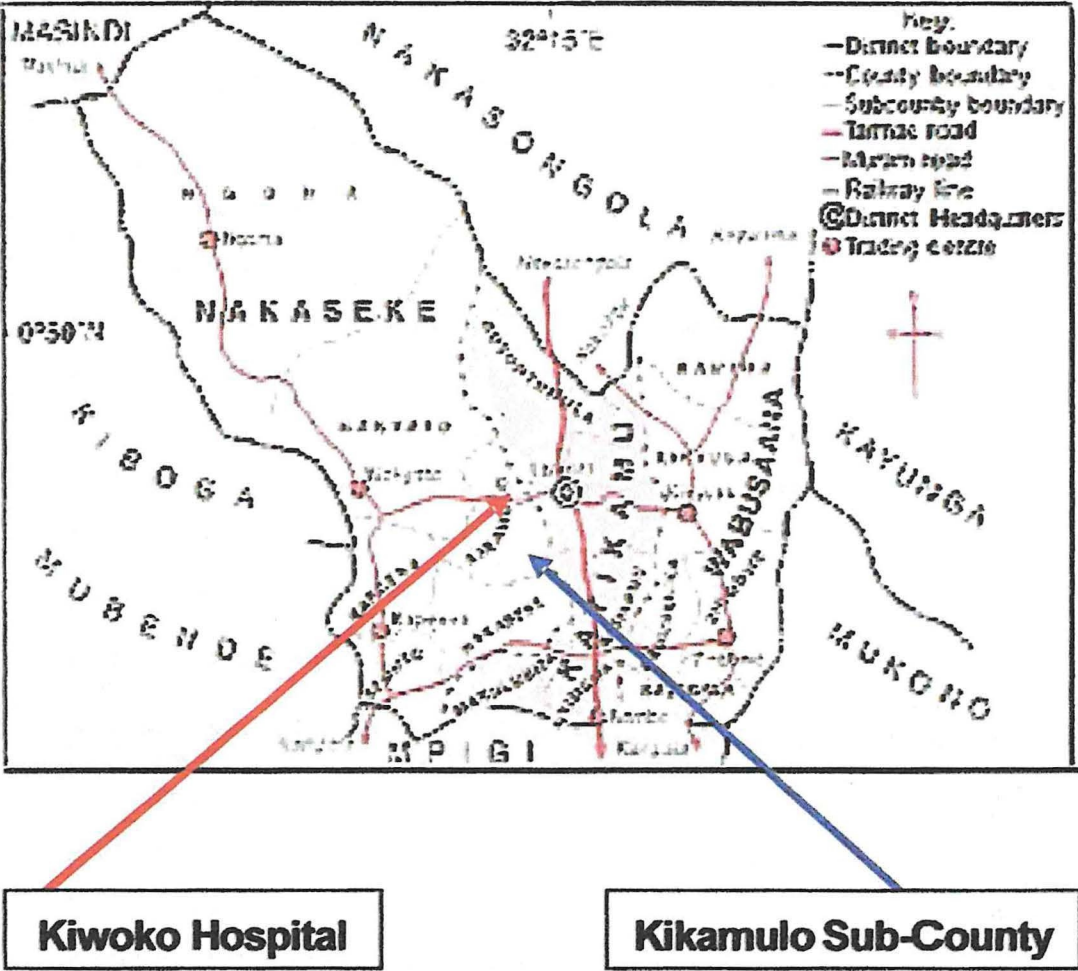


Appendix VIII: Time table for engaging students to learn practical

**TIME TABLE FOR ACTIVE PARTICIPATION TO LEARN PRACTICAL SKILLS  
SEMESTER ONE 2015/2016**

YEAR	MONTH			
	October			
DATES	1-7	8-15	16-23	24-31
Year 1	Theory/Hospital attachment	Practical demonstration /Hospital attachment/ self study practicals	Theory/Hospital attachment	Practical demonstration /Hospital attachment/ self study practicals
Year 2	Practical demonstration /Hospital attachment/ self study practicals	Theory/Hospital attachment	Practical demonstration /Hospital attachment/ self study practicals	Theory/Hospital attachment
Supervisor	Anthony/Kabaka	Irene /Patrick	Stephenson	Anthony/Kabaka
	November			
Dates	1-7	8-15	16-23	20-30
Year 1	Theory/Hospital attachment	Practical demonstration /Hospital attachment/ self study practicals	Theory/Hospital attachment	Practical demonstration /Hospital attachment/ self study practicals
Year 2	Practical demonstration /Hospital attachment/ self study practicals	Theory/Hospital attachment	Practical demonstration /Hospital attachment/ self study practicals	Theory/Hospital attachment
supervisor	Anthony /Kabaka	Irene /Patrick	Stephenson	Anthony/Kabaka

Appendix ix: Map of Kiwoko town council showing Kiwoko Hospital



<p style="text-align: center;"><b>Semester two</b></p>	<ul style="list-style-type: none"> <li>• Carry out direct wet, saline, eosin, iodine, formal –either concentration, modified Ziehl Neelen and saline stool preparations, Znso4 concentration technique and water emergency concentration technique.</li> <li>• Examine urine, swabs, sputum, CSF and aspirates for parasites. <ul style="list-style-type: none"> <li>• Stain thin &amp; thick smears,</li> <li>• Carry quality control</li> <li>• Perform microhaematocrit centrifuge</li> </ul> </li> <li>• Perform wet preparation and concentration on sputum for parasites.</li> <li>• Examine urine macroscopic and microscopic.</li> <li>• Examine urine deposit for bacteria, yeast, pus cells, and epithelial cell</li> <li>• Prepare smears on sputum and stain using Hot and cold ZN.</li> <li>• Make wet preration, ZN , agram staining on swab.</li> <li>• Screen blood for HIV, syphills, HCG, brucella, Rheumatoid factor test, serum crag, and helicobacter pylori test and widal test</li> <li>• Preparation anticoagulant, perform haemoglobin estimation tests using cyanmethaemoglobin, acid haematin method, oxyhaemoglobin method.</li> <li>• Prepare drabkin solution, 0.1N, HCL 0.04%, 1% ammonium oxalate, turk’s solution, formal citrate, new methylene blue, brilliant cresyl blue, buffer water</li> <li>• Carry out platelet, total &amp; differential white blood cell, reticulocytes and PCV.</li> <li>• Carry out ABO and Rhesus grouping and x-matching.</li> <li>• Urinalysis</li> <li>• Plus all what has been covered in the above semester</li> </ul>
<p style="text-align: center;"><b>Year two</b></p> <p style="text-align: center;"><b>Semester one</b></p>	<ul style="list-style-type: none"> <li>• Blood film comment , Sickling test, Perform ESR</li> <li>• Bleeding time and clotting time</li> <li>• Urine bio chemical examination, protein, glucose, bile salt, urobilinogen, bence Jones protein, ketones, creatinine tests, pH test, specific gravity ...</li> <li>• Blood sugar test, Glucose tolerance test</li> <li>• Renal and liver functional tests</li> <li>• Electrolytes K, Na,</li> <li>• Prepare benedict solution, 30% SSA, Ehrlich’s, Barium Chloride, and Fouchets.</li> <li>• Preparation of culture media</li> </ul>

<b>Semester two</b>	<ul style="list-style-type: none"><li>• Preparation of CUSO<sub>4</sub>, 0.85% Normal saline, secretor status tests, make cell suspension of donor cells</li><li>• Perform Direct coombs, indirect coombs, checked cells,</li><li>• Preparation of packed cells, fresh frozen plasma, platelets and antisera.</li><li>• Manage stock cards and records.</li><li>• Pre and post HIV counselling.</li><li>• Quality assurance and control.</li><li>• Stool, urine, CSF and pus swabs culture.</li></ul>
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Appendix xi: Request letter for students' attachment to HIV, pharmacy and records





**Appendix XIV: Introductory and acceptance letter**



**KYAMBOGO UNIVERSITY**

P. O. Box 1 Kyambogo, Phone: 041-288001/2 Fax: 041-220464  
www.kyambogo.ac.ug

FACULTY OF VOCATIONAL STUDIES  
DEPARTMENT OF ART & INDUSTRIAL DESIGN  
**MASTERS IN VOCATIONAL PEDAGOGY PROGRAMME**

10<sup>th</sup> November, 2015

KINDRO MEDICAL LABORATORY  
TRIAKWE SCHOOL. P. O BOX 149  
LWERO.

*Permission granted  
Principal  
12/11/2015*

**RE: INTRODUCTION OF NKURIKIYIMANYA STEPHENSON**

This comes to introduce to you NKURIKIYIMANYA Stephenson a student of Masters in Vocational Pedagogy (MVP) Programme at Kyambogo University. This student bears registration no. 14/U/12993/GMVP/PE and in his final year. As a requirement for graduation, this student is expected to carry out Action Research through a collaborative process with World of Work.

Any support rendered to his is highly appreciated.

Looking forward to your usual support.

Yours Sincerely,

**Chris Serwaniko**  
Project Coordinator, NORHED MVP Program  
Masters in Vocational Pedagogy Program



Appendix xv: Determination of sample size using Krejcie and Morgan (1970) formula

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384