The Role of ICTs' in Field Supervision of Undergraduate Students at Makerere University: An Activity Theory System Perspective

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COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

Signature:_____ Date:_____

Dedication

This research is dedicated to my late parents **Mr and Mrs Jeremiah and Phoebe Odongo-Oyana** who were influential in instilling in me the value of education.

Acknowledgement

Many people have been instrumental in contributing towards the success of this study whom I am invaluably indebted to and would sincerely like to acknowledge their role.

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May the Gracious Lord abundantly - *now and in the future* - reward all of you whom I have directly or indirectly acknowledged.

Abstract

This research investigates how Information and Communication Technologies (ICT) tools mediate in field supervision of undergraduate students. The research used Activity Theory systems to show that good supervisory practices lead to expansive learning.

The study conducted over a two year period of eight weeks each, focussed on nine supervisors, students and administrators in the international programme (*summer for the Western Countries*) is organised by the College of Veterinary Medicine and Bio-Security of Makerere University. The students undertake field attachment and are supervised using various ICT tools.

The research used qualitative methods and was grounded in Activity Theory. Data was collected through interviews, their participation and discussion in the Learning Management Systems (LMS) and the social media network (Facebook & Diigo) and through various feedback reports either from the supervisors or from the students to collect as much information as possible so as to understand the role ICT plays in this process.

The research found that while ICT tools mediate in field supervision of undergraduate students through aggregation of multiple experiences and by providing a virtual proximity in the supervisory process. It also found that there are barriers in its usage which need to be addressed when doing so. These included; internet access and availability as key, power outages, and technical knowhow were also mentioned. The research further found that lack of adequate ICT tools to be used in the field, skills and at times failure to credit the source of content hindered its effectiveness. This inevitably creates lack of consistence in the way they are used.

The research, therefore, concludes that there is need for a holistic approach to address the problem of barriers and usage so as to have a comprehensive implementation plan for the use of ICT in the supervisory process. This will assist supervisors in integrating them in their practice.

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List of Acronyms

AT	Activity Theory
CET	Centre for Educational Technology
CHS	College of Health Sciences
COBERS	Community Based Education and Research Services
COVAB	College of Veterinary Medicine and Bio Security
HEI	Higher Educational Institutions
ICT	Information and Communication Technology
ISP	Internet Service Providers
LMS	Learning Management System
MKO	More Knowledgeable Other
MUELE	Makerere University E-Learning Environment
MUSK	Makerere University Sciences Knowledgebase,
NDSU	North Dakota State University
UCC	Uganda Communication Commission

Chapter 1: Background and Introduction to the Study

1.1 Introduction

Field attachment has been found to play an important part in work-study programs. It serves to bridge the theory and the practice divide by equipping students with the learning experience in their areas of profession. Students undertaking them graduate more employable than their counterparts who do not (Clements & Hays, 2011).

Unlike classroom teaching where the teacher has full control of getting and keeping students' attention and can have an effective reward system (Bennet, 2007), field attachment provides a learning environment which is ill-defined and does not offer the student an opportunity to know the answers in advance (Lombardi, 2007).

Field attachment offers the student the opportunity to learn on their own, observe what is in the field, create their own responses and be able to reflect on the realities with the environment they are in thereby gaining expertise on the situation (Žorga, 2002). Learning is usually self-directed and includes performance of roles and reflecting on the activities being undertaken (Lombardi, 2007). It is therefore an important element in the learning process that provides experiential and at times authentic learning.

In Makerere University field attachment evolved from the School of Medicine as part of the medical training that was initially referred to as internship but later expanded to include Community Based Education and Research Services (COBERS). Internship and COBERS later referred to either as industrial training or teaching practice in other Units of the University were eventually synchronised into one approved policy for all the teaching units.

Field attachment is practical work carried out by staff and students for the purpose of teaching and/or research in places outside the University's control. The University is however responsible for the safety of all those involved in these activities. In this study which took place in the National Game Park where there are wild animals and poor internet connectivity to the national network, the safety of the students and provision of constant communication with them was paramount. The

major objective of field attachment has been to produce practically oriented graduates that meet the required job-related competences of their future employers (Makerere University Field Attachment Policy, 2012).

In the last four years, Makerere University has gone through various learning experiences in the management of field attachment and the challenges to its implementation in terms of disciplines and coverage. This has resulted in making field attachment ineffective and inefficient since the reports made at the end of the field sessions are collected in a repository and are largely ignored (See appendix 4 for a snippet of what happens). This falls short of the learning experience expected from the students, getting timely feedback and enabling the student acquire more knowledge comprehension.

One of the aspects which ensures that field attachment offers valuable learning experience to the students is the way it is supervised and how the students relate to the supervisor in this process. According to Borko and Mayfield (1995), there is a strong linkage between supervision and learning especially when the frequency of interaction is increased as it helps the student explore new ways of learning.

Supervision of students in the field provides challenges in terms of their placement and the difficulties associated with integration of academic principles with field practice. It is important for the students to be equipped with sufficient capacities to ensure that learning takes place and are able to manage the environment where field attachment is undertaken.

The emergence of Information and Communications Technology (ICT) and the affordances these tools have, has increased the enhancement in learning opportunities beyond what had previously been (Karagiannidis & Sampson, 2004; Hoffman, Novak & Venkatesh, 2004). The possibility for people to get connected anywhere and at any time due to the mobile nature of the ICT tools is very high. This creates the ability for the supervisor to receive multiple experiences from the students and for the supervisor to provide them with a social presence which otherwise lacks in the absence of these ICT tools.

Despite some of the educational challenges ICT tools at times present (both *intrinsic* like access, resources training etc.; and *extrinsic* like attitude beliefs, etc.), the

potential to impact on supervision outcomes is high (Bingimlas, 2009). This is in terms of immediacy, increasing mentoring process through constant communication and having provision for reflection and collaboration.

Some of the latest evolutions of the internet has been for instance the presence of what is commonly called Web 2.0 where there are several ICT tools that have enabled more access and participation by users. This access has been done through the creation of a kind of participatory medium that is ideal for supporting multiple modes of learning (Brown & Adler, 2008).

Web 2.0 encompasses a variety of different meanings that include an increased emphasis on user generated content, data, content sharing and collaborative effort, together with the use of various kinds of social software that creates new ways of interacting with web-based applications, and the web as a platform for generating, re-purposing and consuming content (Miller, 2005; Anderson, 2005).

Currently Web 2.0 is both being used as a read/write tool and it has further evolved into a newer, more social and participatory phase. The later phase includes blogs, wikis, multimedia sharing services, content syndication, podcasting, etc.

Therefore, with effective supervision strategies the efficacy of the learners to be properly supervised in the activities they are involved in can lead to good learning experience (Bingimlas, 2009:237; Kim & Bonk, 2006; Singh, 2003). ICT affordances further amplify the human capacities by serving as enablers in many forms by ensuring that more interactions exist between students and supervisors. While in University, there are a variety of these ICT tools, in the field, they may either be lacking or inadequate which may hinder their use in the supervisory process (Walsham, Robey & Sahay, 2007).

Social presence, developed by Short, Williams and Christie (1976), was intended to show how students connect socially and emotionally with their instructors and peers in an electronically-mediated course despite physical distance. Social presence is defined as the "*sense of being with another, shaped and mediated by technological interactions*". This can either be through human or through artificial intelligence (Biocca, Harm & Burgon; 2003:3).

Social presence therefore increases peer interaction and reduces isolation during field supervision. When ICT tools are used during the supervisory process, social presence between the supervisors and the students ensures effective supervision and monitoring of the students. In so doing, it maximizes dialogue and bridges the learning process (Moore, 1997). However, studies are limited about how ICT tools mediate in field supervision. This study explores how ICT mediated systems can be useful during the supervisory process to ensure learning takes place during field attachment.

1.2 The Research Problem

Supervision has been recognised as an important aspect of organised education in higher institutions of learning (Wake, Dysthe & Mjelstad, 2007), however, how ICT tools mediate in field supervision in veterinary medicine has not been sufficiently explored. While supervisors are able to adapt and integrate ICT tools in their teaching and learning activities in the classroom environment, the learning outcomes and the approaches to make those outcomes possible from field attachment has been minimal (Connell, 1985; Hill, 2010).

The traditional method of supervising students in field attachment through occasional visits by their supervisors to check on the students on how they are performing their different tasks and the submission of the report at the end of the field attachment does not allow for sufficient interaction between the student and the supervisor thereby creating inadequacy in the learning process. The process offers a challenge to supervisors and neither offers timely method of probing into the learning process nor what experiences the student encounters in the field.

1.3 Purpose of the Study

The purpose of the study is to investigate the role ICT mediated tools play in the supervision of undergraduate students during field attachment.

1.4 Research Questions

The following questions are to be answered:

i) How does the use of ICT tools during field supervision mediate learning?

ii) What challenges exist when ICT tools mediate in field supervision?

iii) In what ways do ICT mediated tools affect supervisors and students when undertaking field attachment.

1.5 The Conceptual Framework

I will use Activity Theory (AT) as a framework for analyzing activity system in the supervision of students during field attachment. The general philosophy of the activity theory (Leontiev 1978; Kaptelinin, 1999) can be characterised as an attempt to integrate three perspectives in the model namely; the objective, the ecological, and the sociocultural. The concept initially developed by Vygotsky as a relationship between the subject (who is involved in the activity) and the object (why the activity is taking place) mediated through tools is depicted in a triangular form. This framework is now referred to as first generation activity theory (Robertson, 2008).

Engeström (1987; 2001), basing his work on Vygotsky (1978) and Leont'ev (1981), expanded the concept to enable the examination of the system at the macro level of the collective and community in preference to the micro level of individual operating with tools (see Engeström & Miettinen, 1999).

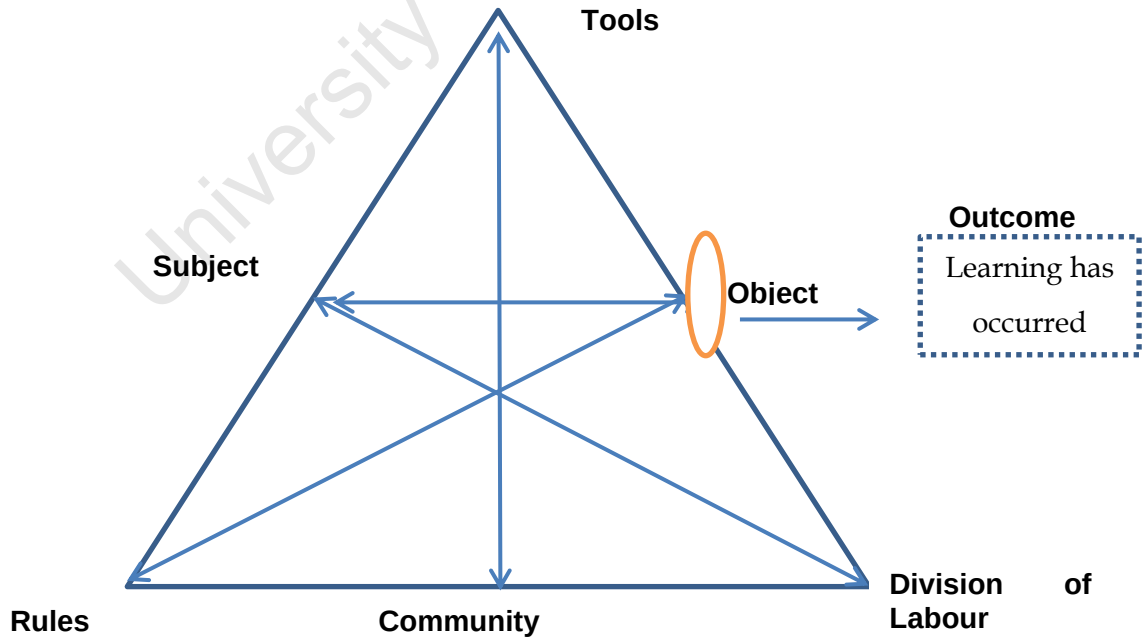

Fig 1.1 Conceptual model of an Activity System adapted from Engeström, 1987.

The model now referred to as second generation activity system included addition of the community, rules and division of labour while emphasizing the interactions of these components with each other as shown in fig 1.1.

The nodes above can be summarized in an Eight-Step-Model arising from the Vygotsky's concept in table 1.1 (Mwanza and Engeström; 2003).

The Node	The Explanation
Activity	What sort of activity am I interested in?
Object(ive)	Why is the activity taking place?
Subjects	Who is involved in carrying out the activity?
Tools	By what means are the subjects performing the activity?
Rules & Regulations	Are there any cultural norms, rules or regulations governing the performance of the activity?
Division of labour	Who are responsible for what, when carrying the activity and how are those roles organized?
Community	What is the environment in which this activity is being carried out?
Outcomes	What is the desired outcome from carrying out this activity?

Table 1.1: The Eight Step Model Explaining the Nodes in the Expanded Vygotskian concept

Activity is seen as dynamic, contextually bound and is the basic unit of analysis (Robertson, 2008). Activities are distinguished from one another by the tangible or intangible objects to be achieved. Tools (artifacts) mediate between the subject and the object. These tools (artifacts) include physical objects, language and symbols that are created and/or transformed in the course of an activity. Tools embed and carry with them historical residue and specific cultural characteristics (Kuutti, 1995) which are simultaneously enabling and limiting.

The second generation activity theory therefore stresses the importance of collective rather than individual activity. Further development has led to the third generation AT where there are multiple perspectives arising from interacting activity systems which occur when two or more activity systems come together to form boundary objects.

According to Engeström, (2001), when two (or more) activity systems come into contact there may be contradictions (struggle between and within systems) which may cause realignment of thoughts, tensions and reflections. This motive force of change and development creates a third object through which expansive learning is possible as shown in fig. 1.2 below.

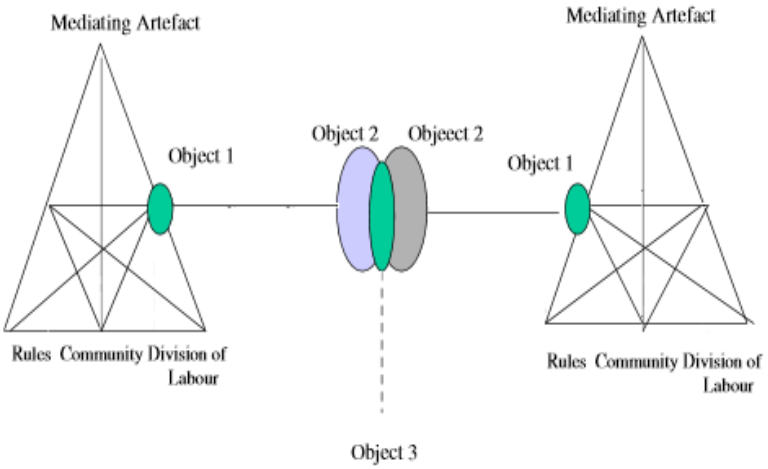

Fig 1.2 Third generation activity theory model (adapted from Engeström; 2001)

Engeström's model was developed as a conceptual tool to understand dialogues, multiple perspectives, and networks of interacting activity systems. This is because different activity systems have different objects and motives; this causes contradictions, dialogues and opportunities for new developments. Thus when the practitioners engage in discussions, debates and reflections then learning beyond what was possible within a single activity system becomes possible (Russell, 2002).

1.6 Scope of the Study

The study is conducted in Makerere University, in Uganda. Makerere University is organised in ten academic units (*nine Colleges and one School*). As a matter of policy, each student is expected to undertake their field attachment at the end of the second semester for at least eight weeks annually. Field attachment is part of the academic program, which is assessed, graded and the grades contribute towards the award to the student.

The University has since 2002, been developing and implementing an ICT Policy to provide a framework for increased ICT capacity and its utilisation. In this study, the mediation of ICT tools in the supervision of students undertaking field attachment is within this mandate.

The ICT tools which are used to mediate in the supervision of students are those available in the Learning Management Systems such as forums, wikis and blogs, the use of simple messaging in mobile phones, social media network like Facebook and other similar tools that create interface with the students in the field so as to increase learning.

The study covering a two year period was conducted at the College of Veterinary Medicine, Animal Resources and Bio-Security (COVAB) where fourth year students undertake eight weeks of field attachment at the National Game Parks and includes staying with identified Model Community farmers to enable them have experiential learning.

In the first year of the study, the students used the Learning Management System (LMS) as their major ICT tool while in the second year, they used the social media network (Facebook and Diigo) for their collaboration and interaction. In both cases, the mediation of ICT tools in the exercise was studied.

1.6.1 Subject Scope

The research is focused on how a student learns when ICT tools mediate in their supervision during field attachment. The students in the field are linked to their supervisors through ICT intervention. The Activity Theory system was used to explain how this eventually leads to learning. This learning should be through knowledge construction, observation, peer to peer interactions, formative feedback and reflection (Kolb, 1984).

1.6.2 Geographical Scope

The research has been limited to the students involved in the international programme of COVAB, which offers the Animal Production, Disease Surveillance and Public Health course. Students from Makerere University, other regional universities (Haramaya University in Ethiopia joined in 2012) and final year College students from

North Dakota State University (NDSU) participated in this eight weeks field attachment programme.

The field attachment created learning opportunities for the students to learn in both experiential and authentic context. The supervisors therefore helped in facilitating the students achieve this learning experience.

1.7 Significance of the Study

This research is significant in establishing how ICT tools mediating between the supervisors and the students during field attachment cause learning thereby making them better students. Secondly, Makerere University would like to ensure that field attachment bridges the theoretical acquisition of knowledge with the practical experience so as to enhance learning in the knowledge-generation process. Thirdly whether ICT mediated supervision of students doing field attachment in Makerere can be institutionalised.

1.8 Summary of the Chapter

This chapter provided the background and the research problem to the study which was supported by the research questions to be used to establish its veracity. The study is underpinned in the framework of Activity Theory system to guide the context in which it is situated.

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Chapter 2: Literature Review

2.1 Introduction

In this chapter, I explore literature that is relevant to the use of ICT tools in mediating the supervision of students undertaking field attachment. I will initially look at some of the models developed to describe supervision, the theories underpinning the study and how field supervision promotes both authentic and experiential learning especially in circumstances where conditions for the two exist.

The second section will show how this acquired knowledge from multiple sources helps in construction of new knowledge. The last section will review literature on how ICT tools mediate in the supervision of students during field attachment and how learning takes place during this process.

Supervision has been variously defined as the relationship between the expert and the novice where the expert guides the novice to achieve the intended outcome. In teaching and learning, it is evaluative and usually done over some timeframe to enhance the skills of the novice in the intended discipline (Bernard & Goodyear, 1992, 2004).

In the educational field, there are three identifiable types of supervision. The first one involves the educational administrators (supervisor) and the teachers (student) where the educational administrator is involved in observing and evaluating lessons in a classroom, documenting the teacher's performance, and sharing suggestions for improvement (Glickman *et al*., 2001) in a way that promotes lifelong learning skills namely; inquiry, reflection and collaboration.

The second one involves the supervisor and the student – *undergraduate or postgraduate* – conducted to guide and evaluate the performance of the student. The areas that have to be addressed are *functional:* where supervision is considered as project management; *enculturation*: where the student is encouraged to become a member of the disciplinary community; *critical thinking*: where the student is encouraged to question and analyse their work; *emancipation*: where the student is

encouraged to question and develop themselves; and *developing a quality relationship*: where the student is enthused, inspired and cared for (Lee, 2008).

The third one which has gained recognition in recent times is one in which supervision is considered a shared activity involving all stake-holders in the school including supervisors, educational administrators and parents to enable the student grow and improve in their output (Sergiovanni' & Starratt, 2006).

Broadly speaking, there is no agreed definition of supervision; however, there are several attempts to define it in the context it occurs. Supervision has been defined as:

> *"a systematic, purposeful activity having clear aims, distinctive content and activities required to change professional knowledge, attitude and skills" Stimpson et.al. (2000:4).*
>
> Kilminster, Cottrell, Grant and Jolly (2007:3) define it as
>
> *'The provision of guidance and feedback on matters of personal, professional and educational development in the context of a trainee's experience".*
>
> While Holloway, (1995:7) defines it as a
>
> *"a formal relationship in which the supervisor's task includes imparting expert knowledge, making judgment of the trainees' performance and acting as a gatekeeper to the profession".*

In this research, supervision is articulated from the educational perspective as being functional, enculturative, emancipative and offers critical thinking to the student (teacher). I have also adopted Kilminster, Cottrell, Grant and Jolly definition as my working definition. In this way I am to align the Makerere University field attachment policy document and how I would like to bring out the outcome activity in the Activity Theory Systems I intend to use.

Traditionally, supervision of students is understood to be mediated during face-to-face interaction or through writing of reports. In this scenario, the supervisor performs the active role of supervising and directing the student's work and the student becomes the passive recipient of whatever type or style of direction and evaluation the supervisor imparts (Blanco & Buhai, 2004).

When students go for field attachment, they are exposed to real life situation; they participate and interface with the environment by applying skills and knowledge

acquired from the classroom. The contact with the environment they are in and exposure to processes that are variable and uncertain is what has been popularly called experiential learning:

> *"the process whereby knowledge is created through the transformation of experience" (Kolb 1984, p. 41).*

At the same time, students who go for field attachment might also find themselves immersed in authentic learning activities, thereby cultivating other skills that may not be common to any discipline such as judgment, patience synthetic abilities and flexibility (Lombardi, 2007). Such situation may arise when the problem in the field is ill-defined, has multiple perspectives, requires reflection, collaboration and multiple interpretation (Lombardi, 2007; Valetsianos & Kleanthous, 2009).

In both situations, where the student is engaged in either experiential and/or authentic learning, knowledge is acquired. Through social participation, observation, perception and discussion, the students construct knowledge and are able to add new meanings and dimensions to the knowledge they acquired in the classroom (Vygotsky, 1978).

As will be shown later, knowledge construction and acquisition is an incremental process to enable the student take their understanding of the subject to a higher pedestal with the guidance of their supervisors. This encounter requires immediate documentation and feedback from the supervisor in the absence of which according to de Beer and Mason (2009) creates gaps in the instruction process. When students have to wait till the end of the field attachment to write their reports, such reports when received is usually of a historical nature. One way of ensuring that timely learning takes place is grounded through the affordances provided by the use of ICT tools (Conole and Dyke; 2004).

With the advent of ICT tools, there are several expeditious methods available which provide systematic and frequent interactions between the supervisors and the students to ensure that knowledge construction is on-going and can proactively be acted on whenever there are activities which require immediate actions (Bingimlas, 2009).

2.2 Models of Supervision

Normally, there is a tendency to equate research supervision with research training and the research responsibilities of the academic role (Johnston, 1999); the prevalent view of supervision is that it constitutes a sophisticated form of teaching (quoted by Delaney, 2009). This ensures that barriers like communication and relationships between the supervisor and the student, which are usually of exceptional hindrances, are greatly improved to make it effective and fruitful.

Atkinson and Woods (2007) say that supervision must be seen within the context of psychological service, its partners and the clients. In practice it facilitates guidance and monitoring through a normative feedback; learning and problem-solving through formative feedback and support through restorative feedback. The use of ICT tools in mediating in a normative feedback provides a quicker way of getting not only formative but restorative feedback.

In a number of essays (Smith, 2008; Smith, 2009), models of supervision have hinged on the relationship between the supervisor and the supervisee. Most of these models are based on clinical and counseling psychology, particularly in the development of the counselor role, although they are easily adaptable to the educational scenario. I will discuss those relevant to the educational scene since it is difficult to divorce counselling from education.

Some important models which have been identified include Developmental Model (Stoltenberg & Delworth, 1987; Kaufman & Schwartz, 2003), which defines progressive stages of supervisee development from novice to expert with each stage consisting of discrete characteristics and skills. According to Kaufman and Schwartz (2003), the principle behind the developmental model is that of on-going growth where learning is a life-long process which enables several competencies to be acquired. Overtime, the supervisee is able to utilise and develop good problem-solving skills and become reflective. The supervisor uses an interactive process, referred to as "*scaffolding*" (Zimmerman & Schunk, 2003), which encourages the supervisee to use prior knowledge and skills to produce new learning (Ronnestad & Skovholt, 2003).

In the second model, supervision is defined in terms of the functions (Kadushin, 1976; Proctor, 1987). These functions are then disaggregated in terms of administration, education and support. The administrative component deals with the promotion and maintenance of good standards of work and policy. The educational component addresses the development of each individual in a manner calculated to evoke and realise new possibilities of usefulness. And the support component encourages the maintenance of harmonious working relationships and cultivation of *esprit de corps*. Supervision helps in the development of an environment that is conducive for fostering togetherness and responding to change.

The third model named Key Issues Model is built on the checklist suggested by Clarkson (1992). A checklist of six-points include: knowledge of the theory; understanding of the theory; application of the theoretical concepts; analysis of the component parts of the theory and application relevant for each client; and synthesising and evaluation which self-evaluation should be undertaken in the wider context. This list is designed to evaluate supervision with a tool for self-evaluation and provide equity for the supervisee.

The fourth one is the Training Model (Holloway, 1995) which hinges on three essential elements, namely: (1) the interpersonal structure of the relationship, which includes the dimensions of power and involvement; (2) phases of the relationship, which include relational development specific to the participant; and (3) a supervisory contract, which includes the establishment of a set of expectations for the tasks and functions of supervision. The relationship resulting from this model helps bond the supervisor and the supervisee (Abiddin, 2008).

In the systems model, defined as the orderly combination of a set of component parts that serve to produce a definable outcome (Curtis & Yager, 1981), supervision is seen as acting within a bigger system. The supervisees are seen within the context of the larger system in which they function in terms of their own intrapersonal subsystems. Thus, within the University context, the training programme, the educational component and the support provided constitute the larger system. This brings out the broader challenges originating from the subsystems as each subsystem has its own unique form which feeds into the bigger whole.

2.3 Successful Supervision

Firstly, I would like to examine the kind of content; supervision processes and context contribute to a successful supervision. I will further look at the framework for supervision that is used to analyse the present practice and how ICT tools mediates towards a successful supervisory process.

According to Žorga (2002), concepts that explain the different ways of learning and acquiring competencies in the process of supervision are many. They include those which explain it through the zone of proximal development (Vygotsky, 1978), through experiential learning (Kolb, 1984), the process of mental adaptation leading to new cognition (Piaget, 1966) through, transformative learning (Mezirow, 1997) and learning within an authentic context (Lombardi, 2007; Valetsianos & Kleanthous, 2009).

In each of these learning processes, the student achieves a change through four stages and four phase transitional points which revolve around disorientation, exploration, re-orientation and equilibrium (Taylor, 1997; quoted in Herod, 2012:51). The disorientation stage occurs because when the student gets to the field and finds an unfamiliar situation which challenges them to think critically about their beliefs and values, the student reacts by becoming confused and anxious. Further exploration and integration with findings in the field enables the student re-orientate to a new perception which eventually stabilises in the mind. It is in this learning process that guidance is required in terms of supervision.

According to Grant (1999:9), supervision is like "*the bridge… it has a kind of material reality: the institution offers a 'sound' pedagogical structure within which the interactions between supervisor and student are assumed to occur*". This balance posed between the supervisor and the student may involve power, identity, desire or even gender (Carroll & Holloway, 1999). It is dynamic and needs careful scrutiny as it influences the outcome of the supervisory process. The use of ICT tools offers increased facilitation, interactions and better observation occurring between the supervisor and the student; it may also add other challenges in this interface which may need to be addressed.

Gebhard (1984) offered a functional approach to the issue of supervision. From his research, he categorised the functions of good supervision as: to direct and inform the teacher's teaching, model the teaching and evaluate the teacher's teaching. This however presents problems as it difficult to define what informs the teacher's teaching or what happens when the student is more knowledgeable than the supervisor, especially with regard to the power relations which exist between the two parties.

2.4 Learning Theories

Fieldwork environment allows learning to take place at any time. Despite the fact there is no clear theory for this kind of learning when online (Xin & Feenberg, 2005), I will highlight essential elements that create the foundations for learning by exploring three learning theories which to a large extent are applicable during field supervision. These are the Social Learning Theory (Bandura, 1977), the Social Development Theory (Vygotsky, 1978) and Connectivism (Siemen, 2004).

2.4.1.1 The Social Learning Theory

According to Bandura (1977), new patterns of behaviour can be acquired either through direct experience or by observing the behaviour of others. He believed that through these observations and behaviours, responses are automatically strengthened. These responses act as guides to future actions. The observed individuals are called models. The models could be parents, people within the family, friends', peers or teachers. The student learns through observation and imitation due to these actions. Both the Developmental model (Stoltenberg & Delworth, 1987; Kaufman & Schwartz, 2003) and the Training Model of supervision suggested by Holloway (1995) support this type of supervision.

2.4.1.2 The Social Development Theory

This theory attributed to Vygotsky (1978) is one of the foundations of constructivism and it has three major themes. The first one asserts that social interaction plays a fundamental role in the process of cognitive development because social learning precedes development.

The second theme is that of More Knowledgeable Other (MKO) which refers to anyone who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept. The MKO is normally thought of as being a teacher, a coach or an older adult who guides the learner in the process of cognitive development.

The third theme is that of Zone of Proximal Development (ZPD). The ZPD is the distance between a student's ability to perform a task under adult guidance and/or with peer collaboration and the student's ability in solving the problem independently. According to Vygotsky, humans use tools that develop from a culture, such as speech and writing, to mediate their social environments. Vygotsky believed that the internalization of these tools led to higher order thinking skills.

The notion was further expanded by Engeström (1987) who postulated that change within and between systems is driven by contradictions. These contradictions enable the learner achieve potential shifts in pedagogical practice.

Vygotsky's starting point for instruction is the learner's current knowledge and skills. Each learner brings experience to the learning situation which together with existing knowledge can be applied to solve problems and results in the formation of new knowledge. Thus the individual is prompted to go beyond his /her present levels of performance thereby developing new abilities.

Thus whatever strategy the supervisor uses, each student is able to construct their own meaning based on an interaction between prior knowledge and current learning experiences.

2.4.1.3 Connectivism

Connectivism is a theoretical framework for understanding learning. According to Siemens (2004), connectivism is the theory of the digital media different from the other major theories because the central tenet amongst most of them is "*that learning occurs inside a person*".

According to this argument, presently knowledge is more distributed than ever, it is now more important for students to know where to find knowledge they require, than it is for them to internalise it. This places the onus firmly upon each student to

develop their own personalised learning tools, environments, learning networks and communities within which they can 'store their knowledge' (Siemens, 2004). There are still a lot of contentions about connectivism (Kop &Hill, 2008) and will therefore be more inclined to use social development theory in this study.

2.4.2 Knowledge Construction in the Learning Process

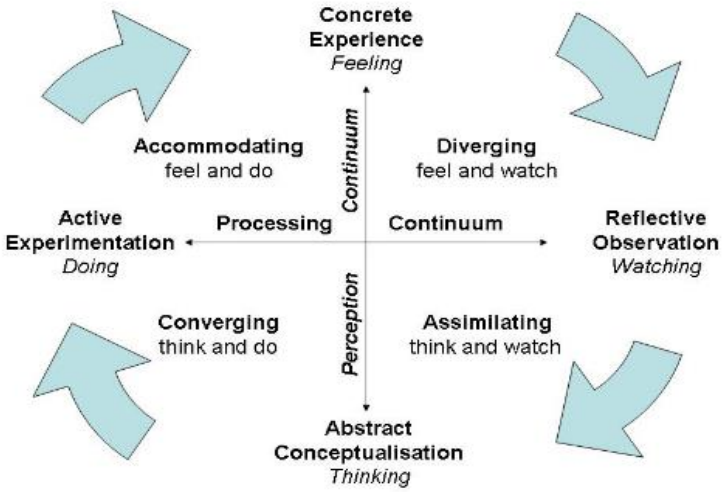
According to Bransford, Brown and Cocking, (2000), people construct new knowledge and understanding based on what they already know and believe. In order to construct new knowledge, there is need to determine what is already known. Therefore a learning needs assessment is an important prerequisite in determining known knowledge in the educational process. The assessment can be undertaken for many reasons; it should, therefore, be clearly defined to enable it lead to practical change (Grant, 1999). The prerequisite provides the gap between the existing skills, knowledge and abilities of the students and those desired in their professional development. Indeed it makes sense for the supervisor to spend time assessing the student's experiences and background early in the supervisory relationship so as to chart out a proper path for achieving the process (James *et.al*.;2006).

Therefore, when planning a learning programme, the learning should be matched to the student's educational needs and context. This helps in creating a fit to the overall learning objectives, assists in aligning with the student needs and allows for the provision of better support to the student.

2.4.2.1 Experiential Learning

Experiential learning involves direct encounter with the environment being studied. According to Dewar & Walker (1999), experiential learning plays a big role in the development of professional competence. Experiential learning emphasises the individual's responsibility to maintain, and increase the level of that competence by integrating learning into everyday practice (Maudsley & Strivens, 2000). In this mode of learning, Kolb (1984:28) asserts that learning becomes a "*process whereby knowledge is created through transformation of experience*". Its basic components are experience and transformation. The perception of experience does not suffice for learning but needs to be extended so that there is transformation through its use in the supervision process.

The experience, according to Žorga (2002:268), corresponds to Kolb's model of learning as a cyclical process in which "*four activities interact, namely the concrete experience, its reflection, its abstract conceptualisation and experimentation*" where the supervisor's role is to guide the student in their learning cycle, through all the four activities or phases of the learning process already described.



Kolb's Learning Cycle, Source: Kolb D. (1984). *Experiential learning: experience as the source of learning and development.* Englewood Cliffs, New Jersey: Prentice Hall

2.4.2.2 Authentic Learning

Due to the unpredictable nature found in the environment, there are certain situations where field attachment gets students in an authentic learning situation. According to Herrington, Oliver and Reeves (2003), authentic learning tasks are said to;

> *"have real world relevance and utility, ... integrate across the curriculum, ... provide appropriate levels of complexity, that allow students to select appropriate levels of difficulty or involvement".*

The likelihood to encounter unpredictable scenario is high especially in areas where the environment is not yet tampered with. The potential to get appropriately complex tasks with real world utility is possible and may require students to explore this environment through authentic learning experiences (Valetsianos & Kleanthous, 2009).

Authentic learning has several key characteristics which Herrington, Oliver and Reeves (2003) describe as:

> "*...the learning environment is ill-defined. Secondly, the activities provide the opportunity for students to examine the task from a variety of theoretical and practical perspectives. Thirdly the activities make collaboration integral to the task. Fourthly, the activities enable learners to make choices and reflect on their learning, both individually and as a team. Finally, the activities encourage students to adopt diverse roles and think in interdisciplinary terms thereby allowing for diverse interpretations and competing solutions*".

These activities encourage students to think and learn through reflection, collaboration with the peers and feedback from their supervisors otherwise it would be difficult to learn without this guidance (Reeves, Herrington & Oliver, 2002).

2.4.2.3 Examining Experiential and Authentic Learning Concurrently

Experiential and authentic learning provides a complex scenario where each offers a different perspective towards learning. While experiential learning involves direct encounter with the environment and emphasises the individual's responsibility to maintain, and to increase the level of that competence by integrating learning into everyday practice (Dewar & Walker, 1999; Maudsley & Strivens, 2000), authentic learning relates to learning in context, by doing, using knowledge through solving problems and explaining the knowledge (Knobloch,2003).

Thus there is a possibility for a scenario where both experiential learning and authentic learning take place. This possibility occurs where there is direct encounter with the environment and where such environment has tasks which require using knowledge through solving problems and the explanation of that knowledge about the activities arising within such setting. In that kind of scenario, students learn directly about the relationship of knowledge to the physical reality of the place. This is achieved through environmental, social and cultural dimensions whereby what is known have a past, a present and a future (Knobloch, 2003). Students have some control over their own activities as well as learning and through these means, students learn about key importance of relationships and respect for the learning and

supervisory process[1]. In both scenarios there is a commonality of knowledge construction through reflection, collaboration and engagement in cognitive work that involves inquiry into an in-depth understanding of a prior knowledge base during substantive conversation.

2.4.3 Establishing Baselines and Developing Competencies

The assessment of a learner's need is a crucial step in the educational process. It acts as the baseline to the student's current level of competence (James *et. al.*; 2006:32), which, according to Vygotsky, constitutes the "*actual developmental level as determined by independent problem-solving capability*". Establishing this baseline provides a basis for being able to achieve the upper limit presented by the Zone of Proximal Development (ZPD) needed to be assisted by a supervisor. The assistance provided by the supervisor combined with ZPD, authentic learning and experiential learning is what scaffolds knowledge construction (Chung, 2007).

2.4.4 How ZPD Relates to Cognitive Skills

Lajoie *et al.* (1993) viewed cognitive *tools* as any tool that can assist learners in accomplishing cognitive tasks. Four types of cognitive function tools were identified. The first tool function identified was to support cognitive processes, such as, memory and meta-cognitive processes. The second tool function was to share the cognitive load by providing support for lower-level cognitive skills so that resources are left over for higher order thinking skills. The third tool identified was to allow the learners to engage in cognitive activities that would otherwise be out of their reach and the last function tool was to allow learners to generate and test hypotheses in the context of problem-solving.

Constructivist theorists have constantly searched for an optimal context for learning and knowledge construction (Dewey, 1959; Piaget, 1968; Vygotsky, 1978 etc.). The fundamental challenge of constructivism is in its changing the locus of control over learning from the supervisor to the student. They are particularly interested in creating learning environments in which the student can actively be involved. Taking

[1] A comprehensive argument about this Learning environment is given by Gulikers, Bastiaens, & Martens (2005).

students to learn outside their classroom presupposes that the student can manage the learning environment and should help students construct their own knowledge.

2.5 ICT in Higher Education

Tiene (2002) suggests in his study that ICT integration in Higher Education is very critical for social and economic progress of any country. However, the capacity of African universities to lead the process of integrating ICT in education has been inadequate due to lack of access to infrastructure, affordable and sufficient bandwidth, and the human resource capacity to exploit the technology (Farrell and Isaacs, 2007), which has made its use in field supervision of undergraduates low. Despite this low integration of ICT in education in Africa, for Uganda, there has been rapid internet penetration through mobile phones, both as communication and social networking tools; largely because of the various affordances they offer (Lubega, 2011).

The main intention behind the use and integration of ICT in field supervision is initially to achieve better learning outcomes and to get remote learners into a position to learn favourably (Mayes & de Freitas, 2005) but this depends on how emphasis is placed on interaction, flexibility and innovation (Bates, 1999). Technology has been the vehicle through which collaboration and communication can be used to achieve it. As pointed out by Czerniewicz and Hodgkinson-Williams, (2005:xi)

> *"it is essential to develop deep understanding of how technologies mediate pedagogical practices and how they are integrated into learning events".*

In this way, it is likely to have a bigger impact than when there is lack of this understanding.

In another development, Czerniewicz and Jaffer (2007:25) state that

> *"the integration of ICT for teaching and learning goes beyond an e-learning strategy. It requires effective linkages with institutional structures,"*

The integration of ICT into higher education curricular and understanding their affordances require support for students and staff for its success. This realisation that ICT affordances can be exploited to support particular strategies in particular disciplines outweighs using the traditional strategies (Czerniewicz & Brown, 2007).

Research has demonstrated that supervisors' attitudes towards using ICTs are inextricably linked with their perceptions of the nature and content of their subject areas (Selwyn, 2002).

A well-structured blended-learning experience makes it easier to manage the interactions and collaboration among students to achieve expected results. According to Usher (1996), human action is meaningful when interpreted and understood within the context of their social practices.

2.6 Knowledge Construction Using ICT Online Tools

It was noted that knowledge construction is incremental based on both previous and current experiences within a particular context (Dewey, 1959; Piaget, 1968; Vygotsky, 1978 etc). Construction of knowledge can be expedited through several affordances offered by Web 2.0 tools like collaboration, interaction and knowledge sharing which is not possible in the traditional educational supervision models (Cano & García, 2013). Using these Web 2.0 tools, students theoretical knowledge, can further be validated and expanded in the field in an experiential environment. The continuous timely engagement with the supervisor provides a way of ensuring feedback and timely assistance to the student.

Using the LMS, the supervisor provides content which may be in text or multimedia formats. The content in the LMS mediates interactions, reflections and sharing. In field attachment, additional content is acquired through observation, peer interaction and reflection. This later aspect involves social negotiation processes that allow students build meanings through interactions with their peers and the community during field attachment. The mitigation of the supervisor allows for the construction of new knowledge. ICT tools play a crucial role in expediting this knowledge construction. As Rahman *et. al*. (2011:489) point out that it;

> *"Intellectually engage(s) in the process of knowledge construction. In the cognitive and constructivism learning tradition, knowledge construction plays important roles in determining the effectiveness of a learning."*

Davis (2002) further argues that building the infrastructure for online learning requires adequate preparations therefore when it comes to supervision of students,

sufficient preparation is required to ensure that there is little frustration by both supervisors and students in using these tools.

> *"The decision to adopt online technology… even on a limited basis, is always complex and can be risky, especially if the adopting organisation lacks structural, cultural, or financial prerequisites" (Welsch, 2002:21).*

In a number of studies conducted, (Orlikowski, 2000; Clarke & Heaney, 2003; Fahy & Ally, 2005) the change in potential actors' in the supervisory process requires change in awareness, knowledge, power, motivations, time and circumstances. These are changed through human actions and the student -supervisor perception can be adjusted to suit institutional requirement where there is a will to do so.

In their study, Garrison *et. al.* (2000, 2004) found that the assessed students anticipated personal adjustment to online learning in similar circumstance as with those in face-to-face mode. The comparison revealed that the same educational factors required during face-to-face (i.e. cognitive, social and teaching presence) are also required during online learning. However, supervision mediated by ICT tools would be perceived as requiring even greater individual responsibilities with social, cognitive and teaching presence existing.

Garrison and Cleveland-Innes (2005) further emphasize that interaction creates the condition for academic discourse but does not directly create cognitive presence unless it is moderated. Social presence through the use of mobile ICT tools provides immediacy and can be converted to cognitive presence. Teaching presence refers to the design and facilitation of processes that elicit the social and cognitive presence for bringing about educationally- useful learning outcomes (Anderson *et. al.*; 2001).

Three categories of teaching presence were proposed: Firstly, the design and organisation that refers to the planning of the process, structure, evaluation and interaction in an online course. This design requires adequate preparation, communicating and understanding by the supervisor the various facets needed to run the course. Secondly, to ensure sufficient attention of the student about the course, there is need to facilitate discourse through participation and collaboration during the supervisory process. Thirdly, there is need for direct instructions to originate from the

expert so as to contribute to the subject-matter. These instructions help connect the supervisor and the student in the supervisory presence (Lowenthal, 2009).

The framework of online presence discussed here is based on the community of inquiry model, which is a constructivist educational process that involves teachers and students (Garrison *et. al.*; 2000) and best explains the viability of synchronous online learning.

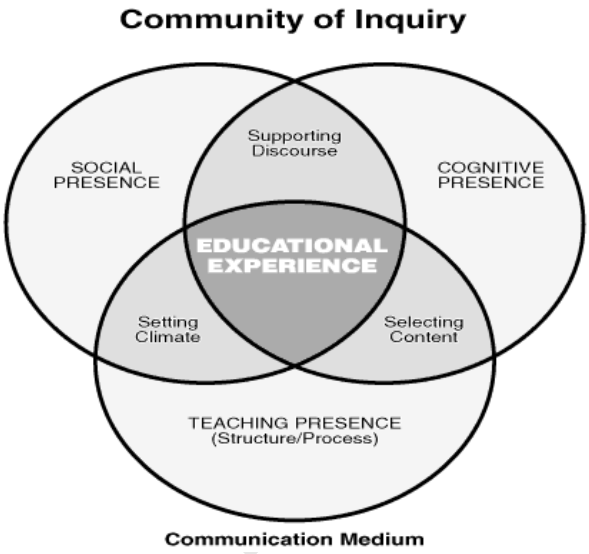


Fig 2.1 Community of Inquiry Model, adapted from Garrison et.al. (2000)

In the model, the interaction between Social presence and Cognitive presence provides a supporting discourse which when combined with teaching presence gives a good educational experience.

2.7 The Role of Virtual Proximity

One of the most significant attributes in the supervisory process of students is to create a form of presence. This has been made easier by the capabilities and the potential provided by the use of ICT tools. Short, Williams and Christie (1996:65) have defined this form of presence as:

> *"the degree of salience of the other person in the interaction and the consequence salience of the interpersonal relationship".*

This degree of salience can be expanded into four components, namely, immediacy, communication, social and teacher presence. I will briefly discuss each of them and relate them to the role they play in the supervisory process and how they offer additional insight into how supervisors can support learning at a distance.

According to Witt (2004), physical distance is an unavoidable factor in field attachment supervision. It therefore poses a challenge to involvement in the manner described in approach-avoidance theory. Verbally immediate communication strategies serve to overcome these barriers by reducing the perceived distance between communicators thereby enhancing the online group's effectiveness. The measure of psychological distance that a communicator puts between himself and the object of his communication is what constitutes immediacy.

The construct of immediacy was defined by Mehrabian (1967) as an affective expression of emotional attachment, feelings of liking, and the degree of perceived physical and/or psychological closeness between people. Immediacy is founded on the premise that individuals are drawn towards persons and things they like, evaluate highly and prefer (Melrose, 2009). In an online environment, instructional immediacy is not straightforward due to the limited nonverbal visual cues. However, online facilitators can communicate aspects of likeability and willingness to become affectively close to the learners. This reduction of the psychological distance between group members enhances the perceived effectiveness of the group's communication and is what is regarded as the immediacy required to interest the learner in the learning process.

Communication presence offers additional insight into how supervisors can support online learning. The more the supervisors engage their students in the learning process online, the more those students will achieve successful learning outcome. Communication can be effected through document postings in the LMS, e-mail, discussion forum, chat (instant messaging), phone calls etc. Communications is important in keeping a continuous engagement with the learner and in providing motivational aspect and interest in the learning, especially since isolation leads to high attrition rate (Stacey & Fountain, 2001).

With computer-mediated communications, online discussions and text exchanges allow the participants to create social presence. Research has been able to establish that online learners are able to present themselves as being "*real*" as well as "*connect*" with others when communicating in online learning environments by using emoticons, telling stories, and even using humour (Lowenthal, 2009). Anderson *et al.*

(2001:5) bring together these cognitive and social perspectives of online teaching in their conception of ''*supervisor presence*,'' which they define as ''*the design, facilitation and direction*'' of both cognitive and social processes for the realisation of personally meaningful and educationally worthwhile learning outcomes. In an online environment, facilitating discourse and direct instruction is greatly used in supervision.

2.8 The Learning Process during Field Attachment

The learning process in field attachment can be attained through many methods for instance in experiential learning, knowledge is created through transformation of experience (Kolb 1984:28). In the model, there is a cyclical process where four activities interact, namely the concrete experience, the reflective observation, the abstract conceptualisation and the active experimentation. This process gives the supervisor the role of guiding the student in their learning cycle, through all the four activities Žorga (2002:268). It further allows for the enhancement of skills which the student already has (*through assimilation*) and to develop new skills required to address new situations (*through transformation*) (Miller, Coyne & Reyngold; 1999).

The learning process through authentic learning is determined by the activities in the learning environment which make collaboration integral to the tasks and those that enable learners to make choices and reflect on their learning, both individually and as a team. The learning process takes place either through reflective dialogue (that is either peer to peer or through supervisor) or through reflective monologue (reflection).

From the socio-cultural view, learning process takes place through socialization (Wertsch, 1991), learning becomes a social process with regard to the interactions between the person and the surrounding facilitated by the use of tools and signs including language. These tools are called meditational means, which has the ultimate goal of a quantitative transformation of the learner from a lower to a higher desired state. It should according to Palloff and Pratt, (1999) encourage critical thinking, accommodate all types of learners and support and acknowledge cultural differences in learning.

Several factors play a role in ensuring this construction builds into useful phenomena. There are two possibilities in deducing these perspectives (Merriam & Caffarella, 1999; Kozulin, 2003), the individual view and the socio-cultural dimension conceptualised through the Vygotsky's notions of psychological tools and mediation (discussed earlier).

From the individualist view, learning is intrinsically a personal process and is the sum total of the present and previous experiences. This view premises that learning is constructed through social interaction and discourse and according to Drivers *et. al.* (1994) it is a process in which meaning is made dialogically (Merriam & Caffarella, 1999).

As pointed by Kozulin (2003) that, despite putting a student in a particular situation, symbolic tools have a rich educational potential which should be mediated by human endeavours.

A rich learning environment is seen as a major goal in constructivism where

> *"prime emphasis is placed (put) on the unique interests, styles, motivations and capabilities of individual learners so that learning environments can be tailored to them" (Reeves 1992; Tharp & Gallimore,1988:177).* ***My emphasis***

For students to engage in higher order thinking, they should have autonomy over their learning processes (Lim & Chai, 2004). ICT provides the necessary pedagogical strategies that facilitate higher order thinking skills and enables students construct their own knowledge through supervision by facilitating discourse and providing direct instructions.

2.9 A Summary of the Conceptual, Theoretical and Literature Construction

I have been able to demonstrate through the literature that there are conditions necessary to ensure how ICT tools mediate in learning. ICT helps create a presence between the supervisor and the student. This enables the supervisor to perform the roles outlined in the supervisory process. Secondly I have also shown that field supervision, involves the expert and novice who are separated by distance. Supervision involves facilitating guidance and monitoring through normative feedback; learning and problem-solving through formative feedback and support

through restorative feedback. I also showed that supervision needs to be undertaken within a particular context for it to be successful. That context has certain condition which regulates its success. As a result of undergoing through these activities, students learn, they are mentored and they develop skills through collaboration, reflection and experimentation. This is the context I will be using in this study.

Chapter 3: The Research Methodology

3.1 Introduction

This research draws its orientation from the interpretivist paradigm. The paradigm according to Denscombe (2007) presupposes that the result of the research is the individual's interpretation of facts based on a systematic approach to analysis and the maintenance of open mind. This means that there is an acknowledgement that facts and values cannot be separated and that understanding is inevitably prejudiced because it is situated in terms of the individual and the event (Elliott & Lukes, 2008).

Although the researcher's subjectivity is accepted within the interpretivist paradigm, there are some general principles that help minimise this subjectivity. The following areas summarised in table 3.1, help minimise this subjectivity (adapted from Somekh and Lewin; 2005).

Reflexivity	The researcher is aware of, able to reflect on and critically analyse own subjectivity and how that might impact on the research.
Triangulation	The researcher implements a wide range of research methods to collect evidence.
Thick Description	The researcher ensures there is enough detail so the reader can share in the interpretation.
Collaboration	The researcher is willing to share with stakeholders the provisional analysis for their comment.

Table 3.1: Minimising subjectivity in Research

This study has been influenced by the social development theory which is based on the premise that knowledge is constructed by the individual through his or her interactions with the environment and that individuals gradually build their own understanding of the world through experience, maturation, and interaction with the environment, to include other individuals.

3.2 Activity Theory Model

Emphasis has been placed on the supervisor and what makes good field supervision of an undergraduate. From the literature, supervision requires

collaboration, reflection, experimenting for the student to learn and mentoring. It also involves the expert who facilitates guidance, monitoring and provision of support to the novice. The novice has to learn, be mentored and solve problems when in the field. However since the field is a distance from campus, ICT tools can be used in mediating the supervisory process. However, the use of ICT tools for mediating this supervisory process so that learning occurs is subject to conditions which have to be addressed for it to be successful.

Activity Theory (AT) framework is useful in providing a systematic way of linking the various activities together. However, where there is more than one Activity System interacting with each other, the object moves *"from an initial state of unreacted, situationally given to a collectively meaningful object constructed by the activity system"*. The new object as a result of the joint activities becomes the framework for analysis or practice and it is the unit of analysis in the activity system (Engeström, 2001).

The framework has been used for analysing the changes that take place when multiple AT systems interact during field attachment to provide experiential and authentic learning.

3.2.1 Explanation of the Model Used

According to Robertson (2008),

> *Engeström was interested in the process of social transformation that includes the structure of the social world in analysis, taking into account the conflictual nature of social practice as minimal model for the third generation of activity theory.*

In this study, there are three Activity Systems which are clearly interacting with each other namely the supervisory process in field supervision, the technology being used in field supervision and the experiential (authentic) learning covered in the University curriculum through field attachment to produce a learned student. Since the three Activity Systems are interacting with each other, there is a boundary object arising from these interactions which produce expansive learning. Expansive learning begins from answering the four questions namely;

> *"(1) Who are the subjects of learning, how are they defined and located; (2) Why do they learn, what makes them make the effort; (3) What do they learn,*

what are the contents and outcomes of learning?; and (4) How do they learn, what are the key actions or processes of learning" Engeström, (2001).

In answering the four questions, there are five principles which help address expansive learning. Activity Theory uses the whole work activity as the unit of analysis, where the Activity is broken into the analytical components of *subject*, *tool* and *object*, where the *subject* is the person being studied, the *object* is the intended activity, and the *tool* is the mediating device by which the action is executed.

The second principle is that of multi-voicedness of the various AT systems nodes in the multiple AT systems interacting with each other. These interactions become either a source of trouble and/or innovation. The multiplicity of actions will demand actions of translations and negotiations for them to be useful in providing good learning outcomes. The dialogue and debates bring out various voices in the supervisory process which have to be considered.

The third principle is that of historicity where pressures from the traditional concepts of supervisory methods have to encounter new concepts of the mediating tools. This layering of mediating tools causes pressures in methodology thus leading to the fourth principle of contradictions which require results in re-alignment of thoughts. These actions are the ones which lead to the fifth principle of expansive learning (increased over a timeframe).

"As the contradictions of an activity system are aggravated, some individual participants begin to question and deviate from established norms. In some cases, this escalates into ***collaborative envisioning*** *and a deliberate collective change effort. An expansive transformation is accomplished when the object and motive of the activity are reconceptualized to embrace a radically wider horizon of possibilities than in the previous mode of the activity"* ***My Emphasis*** *(Engeström. 2001).*

Thus expanding the AT systems to include all the parameters into the matrix developed by Engestrom to show expansive learning we have table 3.2 below.

	AT system as a Unit of Analysis	MultiVoicedness	Historicity	Contradiction	Expansive Cycles
Who are the subjects					
Why do they learn					
What do they learn					
How do they learn					

Table 3.2 Matrix for the analysis of expansive learning.

3.3 The Research Design

In the study, I used qualitative methods to collect the necessary data to be able to deduce from the results. Throughout the study, I was aware of the way my own subjectivity could easily impact on the research since I am also the E-learning Manager in Makerere University. This, therefore, necessitated my use of various research methods rather than just one. Through observation, participation and discussion, I collected as much information from these sources as possible. The study focused on lecturers who are involved in the supervision of students in the international programme organised by Makerere in conjunction with other universities in the region and the United States. The students come once a year for eight to twelve weeks to undertake field attachment as part of the requirements for the programme.

I chose the Activity Theory model to examine how ICT tools mediate in the supervisory process of students undertaking field attachment in ways that enhance student learning outcome. The theory demonstrates how the individual is shaped and molded by the social matrix in which they are situated, the individual does have free will to decide which rules to apply, when to apply and how to apply them. The differentiation enabled me to identify the environment in which the activity was carried out. The participants included College administrators, lecturers, students and the support person involved in field placements. Administrators provided data on what support and control elements go towards supervision of students.

In the first year, the supervisors set up two types of discussion forums in the LMS, the first was to enable the students know each other, what special interest they had in the course and any other information shareable with their colleagues when in the field. A secondary discussion group for was created in *Diigo* but was not used by students despite subscribing them to it. The second forum was created for sharing experiences with fellow students and to provide a feedback mechanism from the students to the supervisors. In the second year, a private group was created on Facebook where posting of shared experience would be collected.

Each student was expected to post in the forum either by using their PCs or mobile phones, at least one feedback from the many topics covered during field attachment. I was interested in this feedback by reading the postings in the discussion forums and the subject areas they were engaged in. I also looked at other tools the supervisors and the students used in the LMS, like blogs, journals and peer review tools to find out whether there was attitude change, whether some cognitive skills were being acquired or whether there had been knowledge construction going on by the students.

Feedbacks in the LMS and face book were examined for collation with the objective. Assignments and chats between the supervisors and students were also examined. More feedback was also derived from the questionnaires administered at the end of the programme to the students. This was supplemented by the interview schedule of 30 to 40 minutes administered to the supervisors.

The support part of supervision was two folds: the pedagogical and administrative. Data for this came from the supervisors and the administrative staff. The latter were instrumental in showing the extent to which ICT affects supervisory practices for students in the field through the interview schedule provided. The study further benefited from the soft copy of the field reports submitted by the students, the hardcopy of the final report given after the course by the supervisors and the evaluation report of the students.

3.3.1 Selection of Participants

According to Serge and Gerald (2008), for a qualitative inquiry, there are no universally agreed-upon standards concerning participants. The number of

participants is determined by a number of factors that are dependent on the intended outcome. Selection of the supervisors was done purposively with level of interest in the international programme, acting as a factor.

For the students, gender, parent institutions were the determinants. From Makerere, out of the three students, one participant was selected, from NDSU, out of the four, one was selected and the only one from Haramaya University, Ethiopia. Data for this study was collected primarily from the group and individual interviews. Additional data from surveys and written reflections gathered from the LMS corroborated information from the interviews. This was further reinforced by secondary data on rules, policies and procedures which govern students and lecturers in their respective roles in the supervision process.

The participants consisted of four supervisors from a total of 17 who participated in the programme, two administrators (there are only two) and three students whose information was collected from semi-structured interviews, examining the content of LMS, the conduct of discussion forum in the LMS and documentation prepared for the students. Additional information was also obtained from the technical support of LMS.

An in-depth interview was undertaken for four supervisors and two students to find out about the supervisory roles conducted with the assistance of ICT tools like blogs, discussion forum, peer review module etc. Table 3.3 shows the sources of data for the study.

		Interview	*Observation*	*Docs/Artifs*	*Content of LMS in the course*
Concepts	**Sub Questions**	L		Supervisor & Students	
		Numbers			
Use of ICT, ICT Tools & Learning Mediation in Learning	What ICTs tools are used to mediate learning during supervision	4	Yes	7	7
	What challenges are there in using ICT				

	tools during field supervision				
	Ways ICT mediated tools affect supervision of students during field supervision	5	Yes		

Table 3.3: An interview matrix showing sources of data for the study

One of the advantages the group interview format offered was that it allowed for deeper understanding into unexpected issues arose from the discussion. At the end of the eight weeks of field attachment, I sat in during the interaction between the supervisors and the students and listened to their interactions and experiences. This face to face interaction was to ensure that students highlighted issues which could not be taken at a distance.

This interaction among participants after the field attachment, encouraged individuals to remember and talk about experiences they had not mentioned during individual interviews. This provided additional opportunity for me to have an in-depth conversation with the supervisors about their experiences on how their use of ICT tools in their supervisory process and gave me the opportunity to record their interactions.

In all instances involving the participants, I began the interviews with the same questions used during the group discussion I had earlier and explored deeper as needed to clarify information. These interviews were recorded and transcribed. Participants were invited to review their transcript and add comments where necessary.

Data from these interviews helped corroborate with those from each participant's preconceptions about the importance of using ICT in supervision, and any influence that their individual skill levels might have had towards their ability to using ICT in the supervisory process.

For the secondary data, I got information from documents and artifacts which addressed the use and factors that promote supervision with ICT. These documents included University policies and plans; especially those related to supervision; and how they fit in within the students' overall assessment. I further examined what

prompted the use of ICT in the units of the University and what tools have been made available to the lecturers and students to enable them be effective in undertaking supervision.

3.4 Analysis of Data

All of the interview transcripts were read by the researcher and coded in the style of a grounded theory approach to data analysis (Denscombe, 2007) where data is developed inductively to fit categories which can then be classified. Data was collected from four sources using different collections tools namely semi-structured interview, document and artifacts, through virtual observation in the LMS and through examining the contents of LMS in the course.

For the semi-structured interview, I was interested in identified themes and patterns which arise from the responses.

Different category headings were generated from the data under various subsections where all of the data were accounted for. An independent researcher was requested to verify the accuracy of these categories and with some discussions and minor modifications, an agreed classification was made.

This identification was done using Excel software. The result enabled me construct trends, patterns and themes so as to get consistencies and differences which occurred from the participants' answers. These patterns formed a basis for the construction of themes for the detailed interviews.

The themes were refined and used for the detailed interview with particular reference to the research objective so as to ensure that they address the research problem.

For the data resulting from documents, I looked for coherence and their relevance to the research study while being mindful of ethical conduct to be followed.

Rough categories of the answers that seem to belong together were used to form key words. These keywords were then summarised and themes derived from them. This formed a basis for the interpretation of the results.

3.5 Quality of Data

It was earlier suggested that for credibility of the data, its collection should consist of other sources. Obtaining data from such multiple sources not only help in crosschecking information and assists in providing specific description of phenomenon more accurately Thus the interviews enabled me to gain a contextual understanding of the supervisors' view of use of the ICT tools, while information from the LMS showed the nature of the various learning activities taking place between the supervisor and the student. This combination of methods allowed for the triangulation of interpretations of the data.

In this study, I used an interview schedule and followed the various activities in the LMS, in Diigo and Facebook. I believe that these research instruments are neutral across multiple occasions within the Makerere context. The data derived should have been sufficiently reliable and transferable.

3.6 Research Ethics

It should be pointed out that despite having the Intellectual Property Policy in Makerere University; it is only the College of Health Science which has got a Research Ethics Committee in place. I will therefore limit myself to what I had to adhere to.

A study of this nature, where I am also involved in the intervention and monitoring of some of the issues being addressed, requires serious consideration with regard to human and ethical concerns. Whereas I have trained some participants in the use of ICT tools in the course of my duties to which I am assigned at Makerere University, full consideration of their abilities in the use of ICT tools was not used to influence this research. Some of the information which did not relate to the research was left out since it was outside my domain.

Issues regarding confidentiality and objectivity were appropriately addressed and acknowledged prior and during the various stages of the research. Permission and consent were sought from individuals and from the University to enable me undertake this research. This was to ensure non-infringement of rights, privacy or privileged knowledge arising from my contact or relationship with the individuals or

my employers, both electronically and otherwise. Each correspondent was further asked to sign a copy of the consent form, a copy of which is in Appendix 3.

Chapter 4: Analysis of the Data

4.1 Introduction and Background information

This chapter is divided into three parts. The first part provides the demographic characteristics of the participants in the study. The second part provides data related to the supervisory process and the third part presents data from documents which supported the study.

The demographic characteristics of the participants are categorized according to age, gender and education level. This will provide general characteristics of the participants studied.

4.1.1 Characteristics of the Participants

There were 3 females and 6 males who participated in this study. Four of them were supervisors from Makerere University, three were students and two were administrators (see table 4.1). All the supervisors had supervision experience of three years. For the two administrators, one came from the e-Learning unit while the other was from COVAB.

Type	Role
Respondent1	Administrator
Respondent2	Lecturer 1
Respondent3	Lecturer 2
Respondent4	Lecturer 3
Respondent 5	Lecturer 4
Respondent 6	Student 1
Respondent 7	Student 2
Respondent 8	Student 3
Respondent 9	Administrator

Table 4.1: Composition of the Respondents

All the supervisors and administrators had worked with the University for over five years. In addition, the supervisors had undergone a two week pedagogic training offered by the College of Education & External Studies and had undertaken more than three ICT training on online delivery. These trainings had been conducted

by either the Agriculture/Veterinary Project (Agshare) or the tripartite (MUSK) project between the School of Public Health, COVAB and Tufts University (USA).

Prior to the beginning of the field attachment, the supervisors had been advised by the Program Co-ordinator that the LMS would be used for supervision. They were therefore, requested to familiarise themselves with LMS tools and be able to receive feedback through the LMS during field attachment. Training in the use of the LMS, use of social media network was done by the unit in preparation for this exercise.

4.2 How ICT tools is used during the Supervisory Process

In the first year of the study, the participants were informed that the LMS would be the major ICT tool for interaction. In the second year of the study, the students preferred using Facebook as a major ICT tool for interaction. To ensure that these tools were available during the supervisory process, all participants were equipped with either computers or laptops connected to the internet. The participants were then asked how they use ICT tools in mediating field attachment during supervision. According to participant 3,

> *"The laptops are intended to access information…we expect them to communicate among themselves, with the supervisors and with their families that is the essence of having this connectivity" (participant 3).*

Another participant said:

> *"The laptops enabled them connect with their supervisors who have their content in the LMS. This enables the students make journal entries, in form of portfolio, receive reports and feedback from students" (participant 2).*

In addition, the participants had mobile phones to increase the rate of interactivity between the supervisors and the students in the field. Two additional mobile phones were given to the students to enhance communication with the College since power outages are common upcountry. On how it is used for field attachment, participant 8 had this to say:

> *"Some of them capture their clips using phones and during the presentations, they project them,…they display for the other colleagues to see what they experienced, so the ICT tools that they use are phones, cameras, the output are mainly photos and videos clips... " (participant 8).*

Mobile phone use was also emphasised for communication and one participant noted that:

""The mobile phone" were mainly used for communication. It gives them easy access to Facebook where they share their things" (participant 9).

Participant 8 further stated in Facebook that

This statement was instructive especially in the second year of this research because when the students requested the coordinator to create a private group for their discussion on Facebook we didn't realise they would be many hits. (See snippets of the discussion in Appendix 5).

Communication between the supervisors and the students was emphasised when it came to using mobile phones. Participants 5 said that mobile phones help the students interact with each and brainstorm during field attachment and be continuously in touch with people involved in the programme and any other stakeholder.

"We have concentrated on using laptops and phones which have been given to the students and are connected to the internet. They have been subscribed to the internet through the modems provided which should ease their communication in the field although the issue of poor reception upcountry is likely to affect their usage" (participant 5).

Some ICT tools like cameras, dongles and phones used in the previous year during supervision of the students were made available for this group of participants. Three of the participants had cameras which were used to gather data in the field and one had a podcaster.

From the participants' responses, I themed them into how the ICT tools were used to supervise students. For instance when they were asked to explain what the LMS role was, participant 1 answered that;

*"The major tool that we have is our **Learning Management System**. It so far the major tool where the supervisors have been able to set various tools which the students can use for reflection and discussion. Students access the system (LMS) to discuss what they have observed and write their journals...we use the same system to give their feedback" (participant 1).*

The themes from the various ICT tools mentioned where aimed at building concepts which enable knowledge construction in the form acceptable to the supervisor. The student can use it to build knowledge through observation, perception and discussion. A summary of this information is given in table 4.2 below.

Tools used by students	*Purpose*	*Supervisory Process*	*Expected Outcome*	*Learning Process*
Laptops /Desktops connected to the Internet	Connection with the supervisor	Setting content for the students	Making Journal entries allows for reflection.	Reflection, Constant inquiry, leads to critical thinking
		Leads to support through feedback		
		Frequent discussion leads to confidence building	Discussion forum leads to constant inquiry, negotiation and articulation	
		Monitors student activity	The student does not digress from the correct path	The students enhances existing and to develop new ones
Email /Skype		Receive Reports	Feedback from students	Offers immediate presence through feedback
	Communication	Develop the student capacity		
		Develops the student confidence		
		Checking methods used in gathering data		
LMS	Use the tools available on the LMS	Setting discussion forum, wikis and blogs	Students discuss, write opinion and work with wikis	Participation, in the LMS, collaboration utilising the tools effectively
		Activities in the LMS to encourage learning		
Phones	Communication and accessing artifacts	Video & audio for feedback	Access what is in the field	Support the observed through artifacts from the field
		Encourages harmonious behaviour		
Camera	Visual captures	Relevant pictures allows for collection of	Visual	Observation leads to

Tools used by students	*Purpose*	*Supervisory Process*	*Expected Outcome*	*Learning Process*
		artifacts		perception and knowledge acquisition
Podcast	Store content	Can be used for feedback	Audio record	Allows for Independent learning

Table 4.2: The ICT tools used for the students in COVAB

4.3 Enablers of ICT tools used in Field Supervision

There were several reasons the participants gave for the promotion of the use of ICT. The increase of students' admission in the University was cited a propelling factor in the promotion of the use of ICT since it helps minimise distance and encourages more interactions with them.

However it was noted that the set of students who enrolled for field attachment in the second year, had higher interest in the use of technology than those of the previous year because of their age and most were coming from America. One participant noted:

> *"This category of students is computer literate; they are people who have seen and used ICT in their lives…in fact some have their laptops which they use to keep their daily journals and access the internet" (participant 3).*

According to participant 9, the presence of ICT, especially the internet, has

> *"made more students to have greater accessibility to a variety of educational material, which, if compared to what is available in the main library is very insignificant" (participant 9).*

The main use of ICT tools was through computers linked to the internet. However

> *"factors hindering their use are pronounced when sometimes students, who are in the field, have access problems or are in areas with internet or when access to some networks are not receptive" (participant 2).*

Other positive reasons cited for using ICT tools had to do with the demographic composition. According to the student participants, most were computer literate and very knowledgeable, therefore, the use of ICT tools in supervision during field attachment would be very handy;

"There are more students who can access material and are able to use them during field attachment" (participant 4).

According to one of the supervisors, the demographic composition of the COVAB staff was also important in the increased use of ICT tools.

"you realize that COVAB has the youngest faculty (College) staff and they are motivated in the use of ICT…they have the enthusiasm to work, although the older faculty members have no interest and are fewer…the younger members are interested in these ICT "(participant 5).

For the participant 4, this is what he had to say

"There are a variety of new ICT tools available for use giving us an opportunity for communicating with the students and allowing for collaboration" (participant 4).

This response was significant since it would enable the mediation of ICT in the supervisory process possible.

Other reasons advanced by participants in increasing the use of ICT include low tariffs by the Internet Service Providers (ISP), affordable computers in the market, and the strong regulatory framework of the Uganda Communication Commission (UCC), that has allowed increased scope and coverage of the country.

"It is now easier to access pictures, high-quality voices and get remainders using the phones or connected computers. However most of the study areas, where the students are, are outside the designated UCC areas"(participant 3).

Enablers to Using LMS & Phones	Part_1	Part_2	Part_3	Part_4	Part_5	Part_6	Part_7	Part_8	Part_9
Technical support	X	X	X	X	X	X	X	X	X
Communication capabilities	X	X	X	X	X	X	X	X	X
Big potential	X	X	X					X	
Knowledge is shareable	X		X	X	X		X	X	
Facilitates learning through the tools	X	X	X	X	X			X	
Facilitates supervision			X	X	X			X	X

Helps individuals keep record of daily occurrences	X		X	X	X	X	X	X	X
Availability of other resources apart from experiential acquisition	X		X		X	X	X		

Table 4.3: How ICT tools in the LMS helps in the supervisory process

4.4 Hindrances to the Use of ICT Tools during the Supervisory Process

In as much as there were positive responses to using ICT tools, participants also highlighted several issues which acted as hindrances towards the use of ICT tools in field attachment. Participant no 8, for instance, was quite explicit about having personal computers.

> *"assumption that every student joining this programme is able to access a personal computer and internet is not a good assumption…it is difficult to have internet availability in the wild during our experiential learning whereby we were required to have real time interactivity," (participant 8).*

For participant 7, despite the presence of these ICT tools, the worry was on power outage which affects the use of these tools in the field.

> *"access to power is a problem because the battery for the laptops and phones need to be charged and there is also the connectivity problems, these limit access and require to plan appropriately so as to undertake all activities"(participant 7).*

For the students from NDSU, owning laptops was taken for granted by most supervisors whereas for the others the absence of laptops was common. Despite having or lacking laptops, the students experienced similar frustration as summarised by the responses above.

4.4.1 Students' Response to Hindrance in Using ICT Tools during Supervisory Process

The reasons for the hindrance to using ICT in field supervision were varied. While the reasons the Makerere student gave was economic and lack of skills, for the student from NDSU and Haramaya, their reasons were technological. For instance

poor connectivity or compatibility of equipment was more of a problem to the NDSU students than possession of ICT tools, which was prevalent to the Makerere students. This disparity led to different reasons that the participants gave as hindering their use of ICT tools during field supervision.

For instance participant 8 had this to say in relation to the technology;

> *"I believe that when in the field and these equipment breaks down, it is likely to be a big problem, because nobody will be able to operate (it) and since we are some good distance from the station, this may affect our ability to use or interact with our supervisors"(participant 8).*

4.4.2 Supervisors' Response to Hindrance in Using ICT Tools during the Supervisory Process

Lack of skills in using ICT tools was cited by all the supervisors during their interviews. For instance participant 2 said:

> *"To increase capacity for the supervisor, there is need for them to be skilled so as to handle the large numbers of students through blogging and to able to appreciate and improve his/her new ideas which come with exposure to ICT beyond our borders" (participant 2).*

Lack of enthusiasm among the senior staff, especially those above 35 years of age and are senior was a reason for non-use of ICT.

> *"I think it's their mind-set, because there are many new tools in the system, it takes time for people to get used to it" (participant 5).*

An important aspect which was echoed by participant 4 was the issue of adequate equipment especially for use in the field.

> *we still don't have adequate equipment, actually some of them like the webcam we use was borrowed, that comes with inconvenience because when you want to use it, that is when the owner wants it returned" (participant 4).*

4.4.3 Other Responses to Hindrances of Use of ICT tools in Field Supervision

Other reasons advanced by participants with regard to the use of ICT tools were either technical, legal, educational or with regard to policies. With regard to technical issues, power outages, connectivity, accessibility and maintenance of equipment were more pronounced even in cases where the facilities were available. Power outages are very frequent upcountry especially when the phone or laptop may need to be powered.

With regard to the legal framework mentioned by the supervisors earlier, the issue of plagiarism could be addressed through the alternative licensing framework like creative commons which they are not aware of. This could help allay fears of plagiarism when using ICT tools.

As for the educational use of ICT, one participant said;

> *"Educational use of phones, for instance is not very known; most use phones for communication, but have never exploited its use in the educational arena or been able to link it with the LMS" (participant 1).*

Further hindrance to the use of ICT has been, according to participant 4;

> *"supervision is much geared towards assessment rather than knowledge acquisition"*

Finally, weak ICT policy implementation within the University has also been instrumental, for most, not to prefer using ICT tools in supervision. In table 4.4, I have themed the interviews following Kadushin's model in the framework how the tools are used for supervision.

4.5 How ICT tools are used for supervision in the College

Administrative	Checking methods used in gathering data	Receive reports. Communicate among themselves & family	Offering virtual proximity
		Communication	Feedback from students
Educational	Checking methods used in gathering data	Access discussion forum, blogs, and wikis from students	Asses student engagement
	Video & audio capabilities	Allows for use with specialised presentation in the LMS	Artifacts to support learning
			For making journal entries, in form of portfolio
Support	Communication		Feedback from students

Table 4.4: How ICT tools are used in COVAB

4.6 How Does ICT Mediated Tools Affect Supervisors and Students in Field Attachment

4.6.1 Administrative Perceptions

Communication is still the most important use of ICT in administration. This takes the form of e-mail which supplements phone calls with the students.

According to participant 1, communication is very important to ensure that problems are sorted in the field and to guide them.

> *"the mobile phone, every student really has it and the supervisors could take advantage of that. It would ensure more communications with the students. The student could give their supervisor a phone call when they have problems in the field. They can phone and express that problem; likewise, the supervisor can do the same by using the cell phone to get or guide the student" (participant 1)".*

For participant no 2 who has supervised many students in this programme;

> *"..we expect them to communicate every evening .., we give them a theme which the students are expected to provide a feedback on depending on the number of themes one has".*

Since the research was done when the University was transiting from faculty to the collegiate system, participants were hopeful that ICT will change the way they think and increase more communication and better quality of students.

> *"in the colleges being formed, there are units that are cross cutting which should be able to increase communication and promote better ways of managing and gathering this information without diluting the information or its quality".*

The participants further noted that in the Memorandum of Understanding between Makerere University and the other institutions on the use of ICT tools is not explicit whether in teaching, learning or supervision. There was therefore no informed way of using it.

4.6.2 Educational Perception by the Supervisors and the Students

The participants' educational perception on the use of ICT was to show how the students benefitted from it. This was in terms of skills, knowledge acquisition or attitudinal change. The result was categorised as either positive or negative and is summarised in the table 4.5 below.

Positive Factors	Negative Factors
Need to confirm that students are in the supposed location	Medical ethics may require physical presence rather than virtual communications, which may affect the use of ICT
Situation is ideal for studies for experiential learning	It may be difficult to share information in real time when there is power outage
Increase of research, collaborations and receive multiple responses about a particular item from students.	It is difficult to change the mindset. Supervisor may not conversant with real time feedback
Field study may deliberately show some of the things not yet known	May lead to poor interpretation by the students in the field.
For early adapters of ICT; they have put up discussion tools, comprehensive notes, learning objectives, pictures, etc.	Waiting for end of field attachment report stifles knowledge construction.
Capture what is strange on video or in pictures	
Enables lecturers to identify research themes	No research theme

Table 4.5: Educational Perception of Using ICT

4.6.3 Supportive Perception

Respondents were agreeable that ICT tools positively support teaching, learning and supervision. None of the participants noted any negative perception whether from students, supervisors or administrative staff. They were unanimous on how ICT has been able to assist them confirm students' presence and how ICT is flexible in capturing as much information as possible about students.

It was noted that ICT

> *"Enables students share experiences and literature, allows for creativity and innovation by the supervisor" (participant 1).*

4.7 Using the Activity Theory System to Show the Pedagogic System

In table 1.1, suggested by Mwanza and Engeström (2003), there were eight questions that needed to be addressed when investigating a system. This was in an attempt to answer how ICT tools mediate in the supervision of students undertaking field attachment.

The objective was that field attachment is undertaken by students. This was done in Queen Elizabeth National Park. When students are first introduced to the

program there are required to watch a video. The video already available on the LMS with the following message:

> *"You are welcome to this collaborative course between Makerere University, other regional universities and North Dakota State University. To learn more about it please* ***watch the introductory video*** (my emphasis) *and also read the course brochure...please, introduce yourself through the forum provided for greetings and introductions".*

In my study, the subjects are **t**he supervisor, the student and his/her peers. The supervisor (*including his beliefs about supervision, experience, attitude, knowledge and skills about ICT*), undertook a number of activities using ICT tools. There were discussion forums, assignments, quizzes, wikis made available to the students in the LMS. In the second year, a private group was set up in Facebook to act as discussion forum.

The students participated in the assignments and discussion forum partly because it was assessed but mainly because it provided a platform for sharing what was going on in the field.

On the discussion forum, participant 8 had this to say.

> *"The potential is infinite for the forum is because it allows for generation of ideas. Since it allows for communication asynchronously, you can have time to think through your contribution. Knowledge becomes shareable as many people participate in it".*

On the other hand participant 6 had this to say about the tools in the LMS

> *"The LMS facilitates supervision and allows students get to timely feedback when there are in the field" (participant 6).*

Despite using the ICT tools, it was not easy for the students to access when they were in the field due to the poor network connectivity.

> *"accessing information was at times difficult when in the field this was worsened by the poor internet access up-country. If this is not possible mitigate the challenges by providing alternatives to access to the students who up-country" (participant 7).*

The tools used in field supervision of students included simple messaging, blogs, journal entries, Skype, discussion forum, mobile phones (access Facebook, simple messaging & take pictures), computers in field attachment discourse. This was summarised in table 4.2

The rules and regulations governing field attachment include University Regulations, Field attachment Policies, the curriculum of human and animal disease epidemics, expectation of supervisors, students, National Park regulations, field attachment environment, rules and conditions of the service provider.

Division of labour included the different roles and responsibilities to be undertaken by students and supervisors. The cooperation needed from staff and guides of the National Park and the support from College administrators.

The Community included the supervisors, external IT providers, students, National park employees, Model Community Farmers, technician and support staff.

The expected outcome is experiential and authentic learning takes place on disease control programs for both human and animal disease epidemics and knowledge of tropical animal production systems in a developing country is acquired.

In summary according to participant number 8.

> *"With all things considered, this course is one of a kind that will set as a front runner in the fight against pestilence and hunger. This program will give its students the abilities and knowledge that will prepare them for future careers in global health care" (participant 8).*

From Facebook, this participant summarised it as follows:

Chapter 5: Discussion of the Results

5.1 Introduction

In this chapter, I discuss the data with reference to the broad objective which I set out earlier using the Activity Theory Systems shown in the previous chapter.

The process of supervision using this model is eventually to show that learning takes place. The framework can be used to show whether it actually transforms the learner to acquire the transformation envisaged.

The chapter is divided into two parts, the discussion of the data and its analysis. The discussion has been made with reference to the theories discussed in chapter 2 within the context of the research.

5.2 Summary of the Findings

Findings have been categorised according to the three questions which guided the research. These findings also further highlighted other issues with regard to supervision and the use of technology in the supervisory process.

5.2.1 How does the use of ICT tools during the field supervision mediate learning

Several ICT tools were identified as being used in the supervisory process. Some of these tools are either embedded in the LMS, others are part of the accessories in the computer or in case of cameras, phones or podcasts enabled the students to record, visual and audio scenes during the acquisition of information. ICT increased proximity between the supervisor and the student since there was frequent communication between them. This enabled the supervisor to monitor the students and at the same time offer them additional support they required.

Secondly, ICT tools were useful in making reports and journals thereby enhancing the relationship between the two parties. The students used ICT for collaboration with their peers and for receiving feedback from their supervisors. Communication between the supervisors and the students is important in keeping continuous engagement with the learner and provides a motivational aspect and

interest in the learning process (Stacey & Fountain; 2001). It also creates a social presence which provides valuable learning outcome (Anderson *et al.,* 2001).

Thirdly, the ICT tools provided ways of building knowledge with what was observed in the field. Their experiences were shared on Facebook and Diigo. In addition, students participated in discussion forums, brainstormed with the others both synchronously and asynchronously. Participation, observation, discussion and mentoring are ingredients of the supervisory process (Glickman *et. al.,*2001) which promote lifelong learning skills.

Thus reflection and observation on what was taking place resulted into thinking, making inquiries and eventually to incremental knowledge acquisition as learners construct personal knowledge from the learning experience itself (Kolb, 1984; Ellaway, Dewhurst & Mcleod, 2004) and when students engage in discussion, debate and reflection then learning beyond what was possible within a single activity system becomes possible (Russell, 2002).

5.2.2 What challenges exist when ICT tools mediate in field supervision

The participants identified several factors which promote the use of ICT tools. These factors have to conform to the rules which promote their usage and have to be adhered to. They include demographic consideration, adequate skills to use the tools and access to the tools or to the internet. The study showed all the students were computer literate and highly knowledgeable. All of them had laptops and could connect to the internet.

For the supervisors, age was also critical. It was found that the younger supervisors were frequent users of the ICT tools than the older and senior colleagues. This greatly helped the students bond more with younger supervisors during field attachment than the senior ones.

Communication during supervision played two roles: the first role was to ensure students got timely support when in the field, and the second was to support student learning by providing a variety of learning environments for the supervisors.

Within the LMS several web 2.0 tools like the journals and discussion forums were set up by the supervisors. These were cited as important for the promotion of

experiential learning since they allowed daily documentation of individual experiences while discussion forums allowed for the generation of ideas. The potential for the use of ICT tools in the supervisory process was infinite because it allowed knowledge to become shareable, made it easier to access pictures, high quality voices and get reminders.

The supervisor was continuously in touch with the student through timely access to information. It created a social interaction with the supervisor which enabled them transform to higher cognitive functions (Hardman, 2005).

In Activity theory, there are rules and regulations which determine how ICT mediates in field attachment. These rules were identified in this research as possessing adequate skills in ICT usage, having physical and virtual access between the student and the supervisor and the presence of reliable power supply as critical role in reducing the challenges in the use of ICT.

Among the supervisors for instance, it was noted that age and seniority in the academic field contributed to their inability to use ICT tools in supervision. For instance, all the supervisor participants said that

> *"Very senior staff members were attached to the programme due to their experience and academic clout, yet they were the ones who made less use of ICT".*

In terms of Activity theory, the rules and regulation which determine use of ICT tools and part of the community consisting of senior and junior supervisors would during field supervision mediate using ICT differently. This was high among the junior supervisors than among the senior supervisors thereby presenting a challenge towards ensuring that ICT is used during field supervision.

5.2.2.1 Technology barriers hindering the use of ICT in Field Supervision

The major barrier related to the supervision of students is the technology itself. Poor connectivity affects the way ICT is used in any institutions. These barriers are in the form of lack of equipment, poor connectivity, limited functionalities and poor maintenance of the equipment. Each of these barriers plays an important role in the efficacy of the use of ICT tools.

Lack of appropriate equipment affects the way field supervision is done. During preliminary focus discussion, the students observed that due to the different

types of ICT equipment in their possession, there was likelihood for them to fail to access or upload content. This would directly affect ICT mediation during field supervision.

5.2.3 In what ways ICT mediated tools affect supervisors and students.

5.2.3.1 Administrative

For the administrative role, the primary concern is the correct, effective and appropriate implementation of University policies and procedures with regard to students who are undertaking field attachment. This requires a monitoring mechanism undertaken to ensure that the supervisors follow established University procedures. Checking the methods being used in gathering data through communication with students is one way in which this was done. It was validated by the daily reports filed by the students while in the field.

ICT tools enabled the College to confirm students' social presence in the field through the communication channels set up to enable them file daily reports and give them flexibility in capturing as much information as possible. From the supervisor's perspective, he or she ensures the student work conforms to the laid- down policies and regulations towards fulfilling the supervisory process.

5.2.3.2 Educational Component in Supervision

In the educational perspective, the primary problem is to increase awareness and competence regarding knowledge, attitude and skills. Knowledge is constructed within this context (Kozulin, 2003; Vygotsky, 1978) and mapped according to the components of the different pedagogical approaches to fit the learning environment (Conole, Dyke, Oliver and Seale, 2004) that takes place.

ICT tools on the LMS and later on Facebook and Diigo were used by students to gather data and access the discussion forum while at the same time enabled the supervisors provide feedback to students. The supervisor became the More Knowledgeable Other (MKO) who had a better understanding than the learner and through ICT was providing feedback thereby creating a presence for the student. The assistance given by the supervisor and the knowledge accessed by the student in the field enabled them acquire new perspective and new interpretation to what was known.

Secondly, through individual and group interactions with others in the College, the supervisors play useful roles in developing interactions during the supervisory process. According to Russell (2002),

> *"people change and learn and as they expand their involvement with others in a community and the tools that community uses in certain ways. Learning is Social; it is then internalized appearing on the cognitive, and may be externalized in future social activity leading to further change"*.

This is what Vygotsky called ZPD and Engeström (1987) termed it as learning by expanding.

Thirdly, learners construct personal knowledge from their learning experience (Ellaway, Dewhurst, & Mcleod, 2003). This learning becomes an active process, where knowledge received from outside or from someone else is used in its construction. The students are able to increase their competence by integrating learning into their everyday practice while allowing them select appropriate levels of difficulty or involvement. In this way, experiential and authentic learning takes place Student participant 6 and 8 confirmed it as follows:

> *"The instructions were very interactive, especially in western Uganda, where we had community visits and focus group discussions with key community leaders. We managed to capture this information in our daily journals and it formed our individual summaries" (participant 8).*
>
> *"To address the public health issues deeply communities are the good source of information; there is a need to have community discussions and visits on how they lead their lives, how they make their income and it affects their livelihood" (participant 6).*

From the summative report, the study showed that the students are aware of the level of supervision and support they get when acquiring new knowledge in the field. Students are able to conceive this support in terms of strategies experienced, the relationship it builds among themselves and the efforts used to bring them together with the community they interact with.

> *"The course is good because it exposes students to a variety of important diseases affecting animals and humans, their epidemiology and control measures which gives a foundation to students who want to have research career in infectious diseases and public health related careers" (participant 8).*

5.2.3.3 Supportive

For the supportive component of the supervision, the primary goal is to improve morale and satisfaction in the learning process to be able to construct knowledge. This depends on providing timely feedback, the level of collaboration which existing among the students and their supervisors and the degree of communication that exists among the students.

Communication between the supervisors and the students and among the students themselves was encouraged through e-mail, Facebook, Diigo, Skype and the LMS. Poor network connectivity experienced in the field was often challenging to the process.

> *"Personally, communication was the most difficult and frustrating element for me. If we can work on our lines of communication, I really think that things like organisation, time management, and resource management can be much more efficient" (participant 6).*

5.3 Implications of Availability of ICT Tools for Supervision

Availability of ICT tools encourages effective supervision to be undertaken since it requires establishing a direct relationship with the student (Cottrell, Kilminster, Jolly, & Grant, 2002). Establishing such a relationship requires a well set-up communication capabilities which also augers with Mezirow's (1997) theory of transformative learning, where students make meaning out of prior information.

Communication capabilities allows for social learning to take place based on the premise that understanding of content is socially constructed through conversations, through grounded interactions, especially with others, around problems or actions and plays a role on how we learn (Brown *et, al.* 2008). One students summarised it as follows;

> *"Since supervision is done using ICT tools,, I recommend the administrators of the course to find alternative ways of engaging students prior to the field attachment. This was worsened by the poor internet access up- country. There is need to mitigate the challenges of access to feedback because of poor internet access up- country" (participant 7).*

Thus, while the role of getting content was appreciated, there is need to view it in a wider perspective. That the implications of the availability of ICT tools during

supervisory process, the poor internet connectivity and power outages provide a lot of frustration, especially for those who would have liked to have real time interactions.

It was also observed that despite, ICT policy being embedded in Makerere's formal structure at the macro level, at the micro level, there is need to have it translated into systemic implementation As noted by one participant,

> *"The centre "doesn't seem to clearly have the vision for the ICT to support staff in its supervisory function" (participant 5).*

5.4 Implications on Supervisors' and Students' Perceptions of the Way in Which ICT Mediates in Field Supervision

As Davis (2002) pointed out that building the infrastructure for online learning requires many factors be considered for it to be effective. Therefore when it comes to supervision of students, sufficient preparation is required to ensure that there is little frustration by both the supervisors and the students in using these tools.

> *"The decision to adopt online…even on a limited basis, is always complex and can be risky, especially if the adopting organization lacks structural, cultural, or financial prerequisites" (Welsch, 2002:21).*

Since it was found out that there are demographically two types of staff, - the young academic staff and the older ones - who are involved in the supervision of the students, each of these has different appreciation levels in the usage of ICT tools in supervision. At the same time, it was acknowledged that "*the senior staff members are attached to the programs due to their experience and academic clout*" and therefore, play a vital role in this programme; it may be important to explore scenarios which allow lecturers to negotiate their own meaning in the supervision of students when using ICT tools. This will not only encourage learning but also reduce on the perpetual frustration that can arise when connectivity does not conform to the expected outcome.

Secondly, as mentioned earlier, there are obstacles which exist in accessing or when using ICT tools, like power outages or poor internet connectivity. It is important to explore various angles to ensure that there is continuity in the learning process when such situations arise. It may be important to explore when using ICT tools what works or does not work within the context. It may be necessary to have certain things

done offline, online or in pre-recorded format. This will ensure that the learning process is not interrupted, non-frustrating and accommodative.

Thirdly, as observed by Schramm (1977), learning is influenced more by the content and instructional strategy in the learning materials than by the type of technology used to deliver instruction. If the content and the design have been properly done, learning will take place irrespective of the technology used. Technology is, therefore, only secondary to the learning process.

> *"Online learning must create challenging activities that enable students to link new information to old, acquire meaningful knowledge, and use their meta-cognitive abilities; hence, it is the instructional strategy and not the technology that influences the quality of learning"(Ally, 2004:3).*

To ensure that there is actually learning place in the learning process, it requires having an effective feedback mechanism. This can be done through a support system which allows continuous communication on what is happening in the field between the supervisor and student. The relationship Halloway (1997:7) and the perspective ICT tools play is what defines supervision.

5.5 Implications on the Learning Process

Schramm (1977) said that learning is influenced more by the content and instructional strategy in the learning materials than in the use of technology. This has a lot of implication on the learning process, especially when the students go for field attachment. Several observations from the students support this in terms of their interactions with the communities they visited, what they observed, what they participated in, what they previously knew theoretically and what they managed to share with their colleagues.

It was also stated from cognitive orientation that, "*learning is considered as an internal process that involves memory, thinking, reflection, abstraction, motivation, and meta-cognition*" (Ally, 2004:21). It recognises the importance of individual differences and tries to use various learning strategies to accommodate these differences. One participant had this to say:

> *"We had group discussions with some of the communities and we got a lot of information ranging from public health, social to financial. This gave us a*

foundation on where to start from in case we are to implement any disease control, public health, developmental programme in future" (Participant 7).

This observation, also confirms that the subject knowledge and skills integral to the course were continuously being acquired in the field. The learning process was taking place and the students were acquiring new knowledge. Secondly, it also showed critical analysis abilities was being acquired through continuous engagement with the people they interacted with in the field. Thirdly, the students were gradually developing team skills in problem solving, especially as most of them came from different institutions.

According to Kolb (2005; 1984), learning results from inferences, expectations and making connections with what is known therefore, different learning styles and learner perceptions, as explained by Myers (1978), are some of the cognitive responses to learning that progresses through a typical mode of thinking, remembering, or problem solving. The students and the communities where field attachment was taking place both benefitted. Learning through this interaction was mutually productive as noted in a typical encounter:

"The leaders (in the community) were very excited to learn these new skills and were even more excited that they will be able to sell the same animals for more than before with little to no capital investments. The students and I can leave Uganda knowing, even if ours actions affect only a few, that we have left it a better place than we found it" (participant 8).

Students tend to acquire plans and strategies for the learning process to take place. Prior knowledge acts as a source for reinforcement of additional knowledge. The information must be perceived, and this takes time to be internalised. Therefore, when a student asserts that:

"The course is very wholesome; it gave me a new perspective on different aspects of science and life" (participant 8).

It suggests that learning is an active process, and knowledge is constructed through processes of accommodation and assimilation, and that new knowledge comes from experiences within an existing framework (Piaget, 1968).

5.6 Implications On Activity Theory Framework

5.6.1 Broad Implication on the Framework

In undertaking field attachment, it was noted that the National Park presents a unique situation where students can engage in both authentic and experiential learning and one creative and promising way revolves around the use of technology (Veletsianos & Kleanthous, 2009). However without technology, authentic and experiential learning can still take place. Students engaged in field attachment are in situation where they do not know the answers in advance and therefore create their own responses in such situations. They therefore engage in inquiry, collaboration with their peers, evaluating the information they get in the field and thinking about its importance. Their reflection in such circumstances leads them to self-directed learning thereby engaging in authentic learning (Harrington, Oliver and Reeves, 2006). At the same time learning is a "*process whereby knowledge is created through transformation of experience*" Kolb (1984:28). Its basic components are experience and transformation.

Supervision offers a way of mentoring and facilitating learning as well as developing a student from a novice to an expert (Atkinson and Woods, 2007); Stoltenberg & Delworth, 1987; Kaufman & Schwartz, 2003). ICT offers the proximity required to achieve this. This aggregate transformative experience taking place during field attachment is shaded in the fig. 5.1 where a student experiences authentic and experiential learning in the park during supervision.

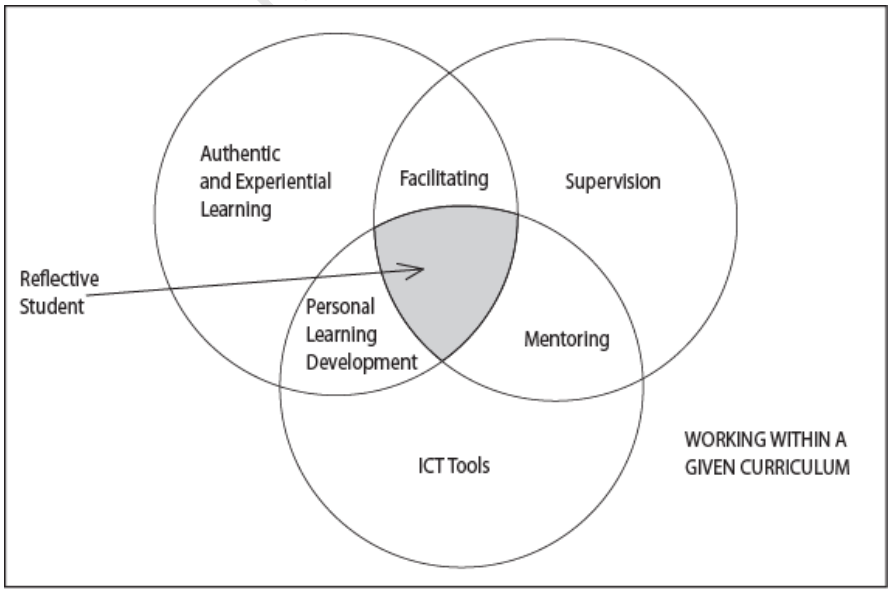


Fig 5.1 Showing the Expected Learning Outcome when ICT Mediates Field Supervision

5.6.2 Specific Implication

In terms of Activity theory, the national park offers more than one Activity system during field supervision. The perception of experience does not suffice for learning but needs to be mediated and extended so that there is transformation through its use.

In the first instance, students undertaking field attachment can be mediated through occasional visits and having face to face contact during these visits.

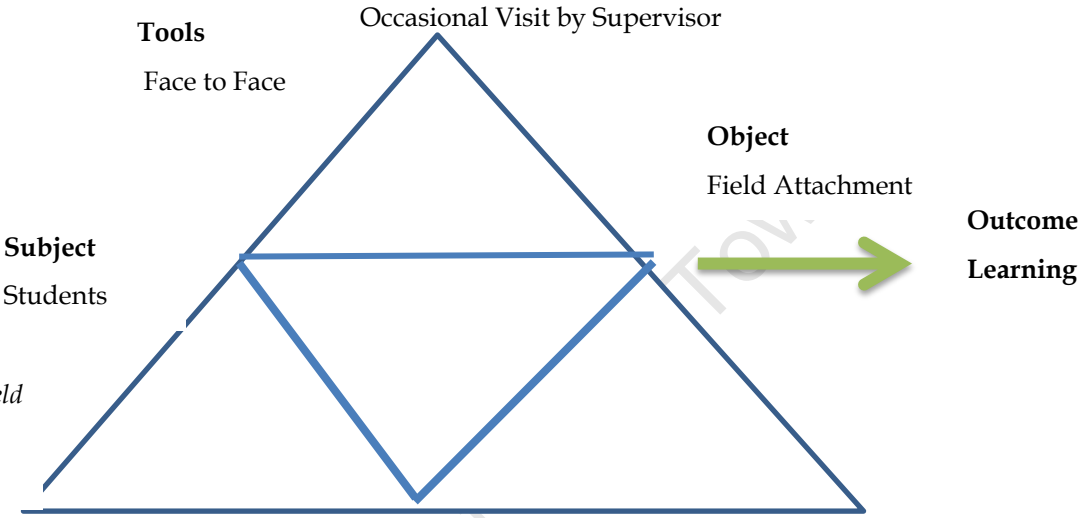


Fig 5.2 Supervisor Mediate

The supervisor mediates so that learning takes place. Using Engeström 2nd generation AT systems we have students going for field attachment and supervisors make occasional visits as it is currently the practice.

When there are occasional visits by the supervisor, fig 5.2, there is very little control of what the student does. The student most times will be relaxed with the activities she/he engages in. However the Park has its own rules which may be contradictory or cause tension with the University Curriculum. This tension challenges the way the student responds and undertakes field attachment. However, the desired outcome will be fewer. It is likely to include collaboration, some experiential learning and a few lifelong learning skills since monitoring aspect will not be strict. The student participates in the programmes as a matter of routine.

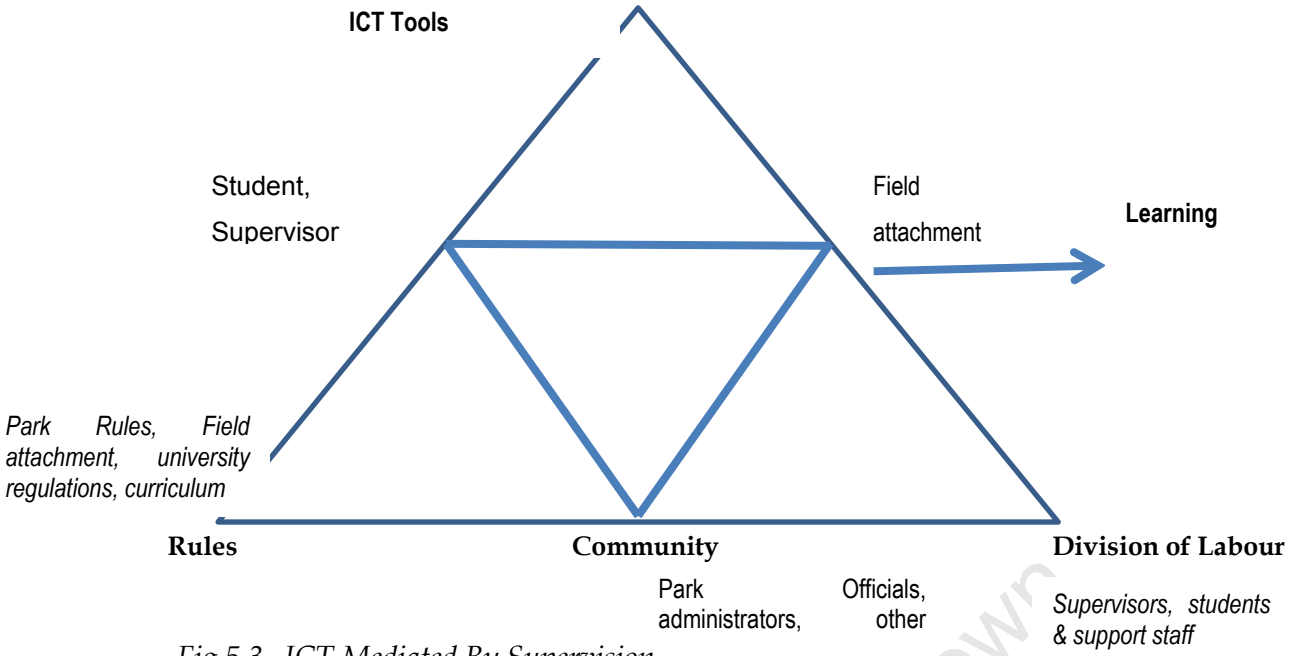


Fig 5.3 ICT Mediated By Supervision

In the next case, where ICT tools are used for learning during field attachment, the student has a number of ICT tools to expedite the process of getting information during field attachment. The student is exposed to authentic and experiential learning. Learning is mediated using ICT tools. The collective rather than individual activities are undertaken.

In using the ICT tools there is a potential tension which arises due to the virtual proximity being offered by the supervisor when technology is introduced. The outcomes are more due to the virtual proximity the student has with the supervisor. Participation is more pronounced, and guidance is frequently offered by the supervisor. There is also increased collaboration between the supervisor and the student. There is room for critical thinking and reflection and lastly the likelihood for guidance towards the student becoming an expert in the discipline is very high.

There is therefore a contradiction between the desired outcome by the student when she/he was working independently and when technology is now introduced. Secondly because of that contradiction, expansive learning occurs at the boundary object as of the activity systems engage in discussion, debate and reflection. (Stevenson, 2008).

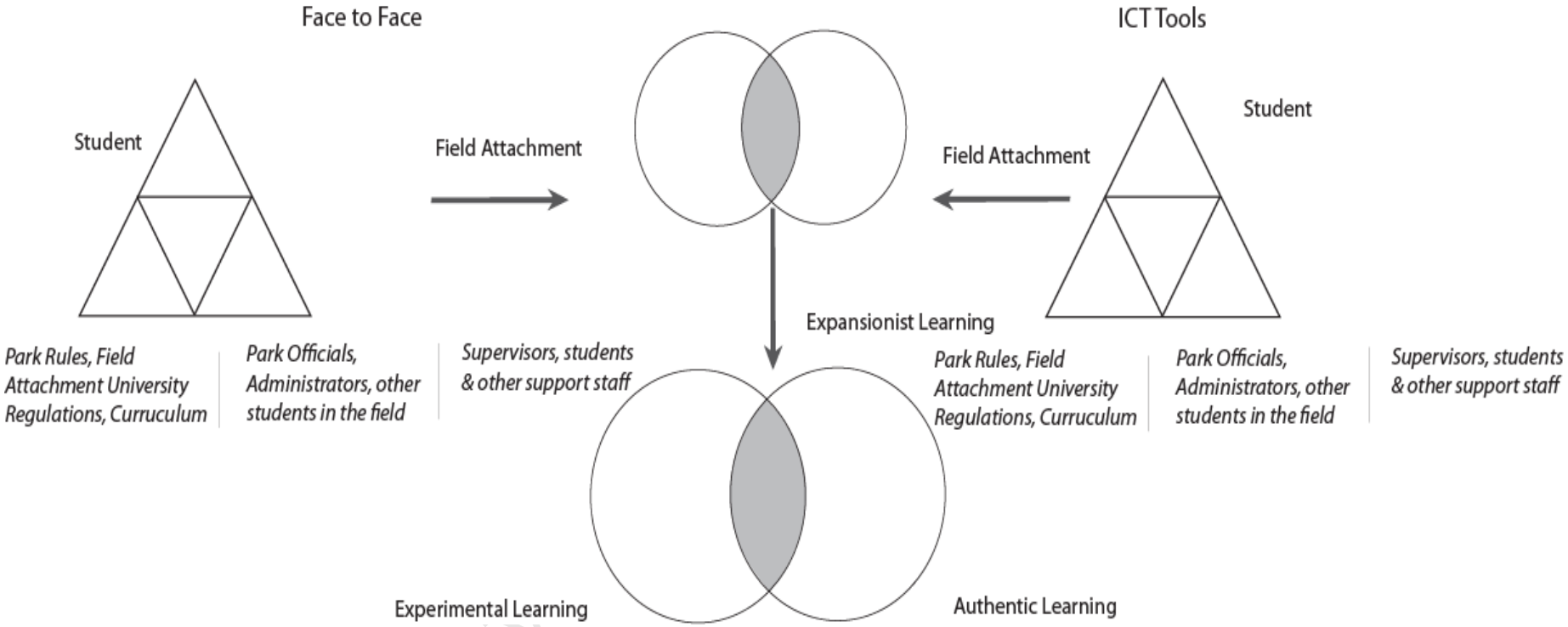


Fig 5.4 Showing the Tensions Which Arise from Occasional Mediation and ICT Tools Mediated in a Mixed Learning Environment of Field Supervision

5.7 How Expansive Learning Takes Place

I will now summarise in the table 5.1 below how Expansive Learning Takes Place as was articulated by Engestrom (2001) in table 3.2.

	AT system as a Unit of Analysis	**MultiVoicedness**	**Historicity**	**Contradiction**	**Expansive Cycles**
Who are the subjects	Student, Other Students, Supervisors, Park Officials	Voices of students who have their own perceptions & beliefs, Park Officials who have their interests on how the Park is Managed and Supervisors with own interests	All the subjects bring their historicity in the Activity Systems		
Why do they learn	Multiplicity of things in the park. Directly, Indirectly as required by Field Attachment Policy		Pressures of traditional supervisory methods	Contradiction new rules in the AT	Feedback provides aggregation of knowledge
What do they learn	Disease control programs for both human and animal disease epidemics and knowledge of tropical animal production systems		Layering of new methods may be a network of layering	Struggle between the old and new methods	New ways of collaboration (Cross-cultural), empowerment, Negotiation & Articulation
How do they learn	Through experiential and authentic learning	Dialogue & Debates	Relearn New Methods	Re-alignment of thoughts	Reflection, Articulation, Content Diversity

Table 5.1 Expansive Learning Table

Chapter Six: Conclusions and Recommendations

6.1 Introduction

In this chapter I present the review of the Research questions, the Conceptual framework the literature that covered the study, conclude and make recommendations based on findings of the study. The recommendations and conclusion paves way for areas which may require further investigation with regard to this study. This will contextually help place the issue of ICT-mediated field attachment supervision in the discipline.

6.2 Review of the Research Questions

The study set out to investigate the role of ICTs' in field supervision of undergraduate students. Three subsidiary questions were used to get the data namely;

i) How does the use of ICT tools during field supervision mediate learning?

ii) What challenges exist when ICT tools mediate in field supervision?

iii) In what ways do ICT mediated tools affect supervisors and students when undertaking field attachment.

The research questions helped address the role ICT plays in field supervision of students by showing that there are several ICT tools that are available and are used in the supervisory process. The questions enabled evidence to be collected on how these ICT tools are used in supervision. It further showed that by providing virtual proximity and enabling the students receive feedback from their supervisors ICT mediated in learning. In addition, the use of Facebook and Diigo to discuss observations among the students led to increased collaboration among them. The questions further highlighted factors that promote and those that hinder the use of ICT in the supervisory process.

6.3 Review of the Conceptual Framework

The Activity Theory system has provided a framework for understanding the role ICTs tools play in mediating field supervision of undergraduate students. It also

highlights the role of the various communities that influence and dictate how such a tool is used and applied.

Students used portfolios, sent reports and communicated frequently with their supervisors. The ICT tools offered virtual proximity to the supervisors thereby enabling the students get timely feedback, thereby enabling incremental student development in learning as confirmed by Vygotsky's Zone of Proximal Development (ZPD).

The AT systems has also shown that authentic and experiential learning interface when field attachment takes place in an environment like the National park where it hosts natural habitats. The aggregation of the two interfaces during field attachment led to students looking at situations from multiple perspectives, allowed them collaborate either asynchronously or synchronously and enabled them reflect on their activities. The students and their peers shared this constructed knowledge and communicated to their supervisors through journals, portfolios and discussion forums. The supervisor provided feedback to allow for the refinement in the student knowledge gap which enabled them acquire higher cognitive functions (Hardman, 2005).

The objective was to interrogate the role of ICT in field supervision. The field attachment took place in the National Park which has its own rules and regulations to guide everybody visiting the park. Field attachment itself is further guided by the Makerere University Field Attachment Policy on how it should be conducted. In addition, consideration had to be made on the way ICT tools were used for mediation since there were constrained by other drivers that required greater efficiency. These policies and regulations are the rules in the AT system which guide the outcome of the supervision.

There were several people involved in the supervisory process who included, people managing the park, the other students involved in the supervisory process, the service providers handling ICT systems and the administrators at the College. All of them played different roles in the supervisory process. The various people involved and the roles they played in the process constituted the community and the division of labour activities in the AT system. The outcome throughout the duration of the field attachment was to eventually have a transformed student.

6.4 Review of the Literature

The literature showed how knowledge is constructed and how the supervisory process guides those undertaking field attachments. The literature further showed that field attachment allows for experiential learning to take place as the students interface with field environment. However, there are situations where field attachment gets students in authentic learning environment and are forced to use additional attributes to address such situations. The findings showed that in using ICT tools there are possibilities of tensions or contradictions which arise due to the virtual proximity provided by the supervisor.

The number of outcomes increase due to the virtual proximity the student has with the supervisor in terms of collaboration with the supervisor, critical thinking, reflection and guidance.

The contradiction is between the desired outcome by the student working independently and when technology is introduced. Due to this contradiction, expansive learning occurs as members of the activity systems engage in discussion debate and reflective learning.

6.5 Review of the Methodology

In order to minimise subjectivity in this research, I was particularly conscious on how I collected data from the LMS which arose by virtue of my being the E-learning Manager. I was careful to use only that which was relevant to my research. This could have led to some level of subjectivity but because of the different sources where data came from, it tended to present a better picture. In the process I have tried to provide as much detail as I could on what I did.

6.6 Recommendations

A number of recommendations can be made from this study. I have been able to identify the following:

Firstly, there is need to increase the use of ICT as a major tool in the supervision of students as it offers timely feedback, encourages discussion and collaboration among students and promotes experiential learning. It was noted that while there is policy and the strategic plan is very clear on ICT's role in teaching and learning, its implementation in field supervision is not very clear thereby giving a lot of leeway to the way supervision of undergraduate students is performed by the supervisors.

Secondly, the University needs to invest more time, resources and commitment to provide the necessary support that would be required for the supervision of students using ICTs. The use of ICT in field supervision requires additional time which the supervisor may be unwilling to give. This trend needs to change so that performance of the supervisors is tagged to the use of ICT in field supervision. This could further be complemented with continuous training in ICT skills to various categories of supervisors.

The third recommendation is the presence of very many ICT tools which can be used in field supervision. There is need to explore these so as to improve the supervisory process. The use of E-portfolio for instance would help strengthen this process.

Finally, as a result of lack of a strong ICT team. The College does not benefit from the strong feedback mechanism currently offered by ICT. It has largely relied on the final students' reports made after the field attachment which means that knowledge created and experienced in the field is not fully documented. A dedicated team would be able to resolve this so as to get timely information.

The presence of a strong feedback mechanism allows for an effective formative assessment on the programme to be undertaken. ICT tools would be able to provide a faster evaluative method which would help in the improvement of the programme rather than waiting for the subsequent academic year since the environment is dynamic.

6.7 Area for Further Research

The study has shown that ICT mediates in the supervisory process and results in expansive learning. There is a lot of information, reflection and learning, discussion and collaboration during the high interactivity between the students and their supervisors. There is need to know what happens to the knowledge acquired after field supervision. Does this knowledge add value to the student, to the program or improve its management. This is an area which will require further investigation as to what happens to the knowledge and the experiences acquired after field supervision.

In addition, it would be worthwhile knowing whether the students' studies are used to assist in the improvement and for the development of new curriculum guidelines.

6.8 Limitation of the Study

The study was limited to students who participated in the international (summer) programme of the College of Veterinary Medicine and Bio Security of Makerere University. The students came from Makerere University, Haramaya and North Dakota State Universities.

Makerere University has a memorandum of understanding with these universities to provide stations for field attachment. This part of the study has been incorporated into the curriculum of the respective participating universities. The students normally go for these placements in two national parks in Uganda namely, Queen Elizabeth and Lake Mburo, where they have to interface with the local communities.

They visited and interacted with a number of other farmers in Uganda where they shared their book experiences with the practical side offered by the community. In addition, they held discussion meetings with various animal research and disease control Institutions in the country to find out how these institutions interfaced with the various stakeholders. These engagements lead to the students' assessment.

6.9 Conclusion

The lecturers who would like to use ICT tools in their supervision should be aware of student characteristics and situations that can present barriers to the students' effective learning and success. While these tools present a lot of advantages, the lecturer's mindset should be tuned to using ICT and what is possible when it is fully or partially used, otherwise they continue maintaining their traditional methods of supervision.

Supervision allows construction of knowledge to take place and assists in the student becoming an expert. It was shown that the use of ICT helps broaden these capabilities and leads to expansive learning. For the College of Veterinary Medicine and Bio-Security to have a strong support with her partners in this programme, they must be prepared to integrate these new strategies into their traditional repertoire of skills so as to remain relevant. This requires periodic sensitisation and skills acquisition so as to increase confidence, exposure and attitudinal change towards the use of ICT tools during the supervision of students.

Finally it is important for the University to show more commitment to the integration of ICT tools in all its core functions so as to increase productivity and usage for both campus and off campus activities especially in the supervisory process.

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APPENDIX 1- Interview Schedule

i) How does the use of ICT tools during the field supervision assist you in mediating learning?

ii) What types of challenges exist when using ICT tools in field supervision?

iii) In what ways do these ICT tools affect supervisors and students when undertaking field attachment?

A detailed interview of about 30 – 40 minutes with 4 supervisors and 3 students to find out how ICT is used in the supervision process. These interviews were podcasted and later transcribed ready for analysis.

Appendix 2 –Letter of Request

1	*Respondent1*	Administrator	Admin	11.00
2	*Respondent2*	Lecturer 1	Lect	3.00
3	*Respondent3*	Lecturer 2	Lect	
4	*Respondent4*	Lecturer 3	Lect	3.30
5	*Respondent 5*	Lecturer 4	Lect	2.30
6	*Respondent 6*	Student 1	Lect	4.00
7	*Respondent 7*	Student 2	Stude	9.30
8	*Respondent 8*	Student3	Stud	10.00
9	*Respondent 9*	Administrator	Admin	11.00

Dear Respondent

You have been identified as one of the facilitators of the International Animal Production, Disease Surveillance and Public Health by the College of Veterinary Medicine. In this course you will be making a presentation, supervising students and ensuring that experiential learning takes place.

I am undertaking research on The Role of ICTs' in Field Supervision of Undergraduate Students at Makerere University: An Activity Theory System Perspective

I would like therefore to request for your time on Thursday at 11.00 a.m. so that I can hear your view on this.

Your early response will be dearly appreciated

Tito OKUMU

Appendix 3 – Sample of Consent Form

University of Cape Town
Faculty of Humanities
CONSENT FORM

Title of Research Project: *The Role of ICTs' in Field Supervision of Undergraduate Students at Makerere University: An Activity Theory System Perspective*

Name of Researchers: Tito Oyana OKUMU

Email: tokumu@iace.mak.ac.ug

Course Name: Masters in Philosophy (Educational Technology)

Supervisor: **Assoc. Professor Dick NG'AMBI**

Name of Participant: **……**

- I agree to participate in this research project.
- I have read this consent form and the information it contains and had the opportunity to ask questions about them.
- I agree to my responses being used for education and research on condition my privacy is respected, subject to the following:
- I understand that my personal details may be included in the research / will be used in aggregate form only, so that I will not be personally identifiable (*delete as applicable.)*.
- I understand that I am under no obligation to take part in this project.
- I understand I have the right to withdraw from this research at any stage.

Signature of participant: _____

Name of participant: _____

Signature of person who sought consent: _____

Name of person who sought consent: _____

Date:_____ _____

Appendix 4– Snippets of Views On Field Attachment in Makerere University

...are not from mars. They are in house. Unless when you don't ...
> members of staff to be involved in the supervision exercise. These
...members are teaching on the programme as you may be aware

...quest you to discuss with the Dean who appointed you ...
...out consulting anybody to prescribe to you your roles and duties
before you join in polarising our department. If you do not know what
> you are supposed to do, resign and give room for one who knows what
s/he has to do as School Coordinator of Field Attachment. Our staff
...e worked around the clock and that is why they deserve a peaceful
...d successful close of the semester.

...achments were not addressed in the Organizational Manual and there was nee
for the Colleges/Independent Schools to come up with Self-Assessment Reports on field

...utions that some members of staff could have instigated the students strike; policy on field ...achment; position on special faculy allowance and the initiation of the Search Process for the Vice Chancellor and Deputies.

The details:

1. Allegations that some members of staff had instigated the students to strike:

The University Council was concerned that there were allegations that some members of staff could have instigated the students strike on field attachment.

The University Council decided that these allegations should be investigated following the right procedures as stipulated in the University regulations.

...niversity Management was tasked to follow the right procedures and institutional mechanism...
...ng these investigations.

APPENDIX 5- Snippets from Facebook & Diigo

like · Comment · Unfollow Post · June 25 at 11:07pm

u like this. Seen by 9

Was it pride? definitely no, was it by force? no, hen what led to many of us step into water to work on the arted heifer Buffalo?
e 25 at 11:10pm · Like

great!
at 11:12pm · Like

to me I think this was the love to know
lth status by taking samples and to sa
ld drown and die.
· Like

to me I think this was the love to know more about its health status by taking samples and to save its life otherwise it would drown and die.
June 25 at 11:12pm · Like

any way u can have your argument on why that extreme for a wild animal.
June 25 at 11:13pm · Like

That's what we do!
June 25 at 11:19pm · Like

Good save!
June 25 at 11:19pm · Like

Joshua please explain to all what was happening.
June 30 at 1:58am · Like

Oh, it was like a joke but true, we had darted three buffaloes and remaining with only one dart to go, we were even tired and hungry as it was about 3:00pm. we agreed to dart the last and the herd we saw was close to the swamp. we tried to trick the away from the swamp but all was in vein. we shot at one heifer and the herd showed as if it was running towards the dry end. in atrinkling of an eye buffolose turned to the water before the dartyed heifer was immoblised, it followed the rest until it fell into the water. we had no choice except to save her life or else she would drown and die.
June 30 at 9:55am · Unlike · 1

some even did not have gumboots but went with their shoes into the water and I was able to identify game lovers and non game lovers for those who remained behind because of water. any way it was interesting an experience
June 30 at 9:58am · Unlike · 1

Good spirit.
July 2 at 12:05am · Like


TOYOTA
· Comment · Follow Post · June 24 at 10:22pm
Names blacked out
en by 9
See what we are experiencing in the wild, what summer course has done u can not believe. we are studing as well as studing. it is exciting
June 24 at 10:26pm · Like · 1
how about the boat ride on kazinga channel, what an experience on water.
June 24 at 10:28pm · Like · 1
lectures on the surveillance of different diseases and practical experience of using a darting gun. I know that I will leave when I am more than a Vet and more of a Community health expert
June 24 at 10:32pm · Unlike · 2
· Comment · Follow Post · July 2 at 7:27pm
likes this.
Seen by 8
mennn,that was bad,,,
July 2 at 9:35pm · Like
what a suffocation for goats and this is not right. these goats are taken to as far as Southan Sudan and this contributes to transmision of diseases internationally. too
at 10:49pm · Like
diigo
What's New
Tools
North Dakota - Makerere / Contents contributed and discussions participated by
Contents contributed and discussions participated by
Filter: All | Bookmarks | Topics
IMG_0363 - 0 views
www.diigo.com/...mb04
shared on 09 Aug 10 - No Cached
09 Aug 10
US Students studying in Uganda during June/July 2010 - joint course with North Dakota State University (US) and Makerere University (Kampala, Uganda). Photos by