Is blended learning suitable for Continuous Professional Development (CDP)? A case of Health Manpower Development Center (HMDC), Ministry of Health, Uganda

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T able of Contents

Abstract

In 2012, the Ministry of Health, Uganda in partnership with Belgium Technical Cooperation (BTC) under the Institutional Capacity Building project (ICB), introduced the eLearning mode of delivery at Health Manpower Development Center (HMDC) an in-service center for continuous Professional Development in the country. This was aimed at increasing access to Training programs with minimal interference of health service delivery. In order to make decisions on adaptability of blended learning mode in training health workers in the rural setting and securing further funding from the BTC, an evaluation was carried out to ascertain the effectiveness and impact of blended learning in the two sub regions of Ruwenzori and West Nile in Uganda. A total of thirty (30) respondents in the two regions were reached through questionnaires and interview guides. The results of the evaluation study indicated beyond reasonable doubt, that blended learning enabled learning/ teaching at HMDC, if attention was paid to the actual pedagogy of the system rather the medium of delivery. Consequently, this study recommended that the Ministry of Health ought to re-focus on the establishment of better equipped resources centers and ICT infrastructure so as to adopt blended learning mode of delivery for training of health workers in the rural setting. The Interactivity levels of instructional materials, learner support and Monitoring and evaluation systems could well be strengthened at HMDC.

Background

This is a report on the evaluation of the effectiveness and impact of blended learning at the Health Manpower Development Center(HMDC) in delivering the leadership and management training program to the health workers in the rural setting (Rwenzori and West Nile).

Basing on the TOR for the evaluation to be conducted, the eclectic pragmatic paradigm (Reeve & Hedberg, 2003) was the most appropriate choice for conducting the effectiveness and impact evaluation of the blended learning mode. The above evaluation paradigm proposed a different evaluation function for each of the five stages of system design and development; project conceptualization, Design, Development, implementation, institutionalization and project re- conceptualization. The evaluation functions aligned with each of the development cycle of interactive learning system evaluation are; review, needs assessment, formative evaluation, effectiveness evaluation, impact evaluation and maintenance evaluation but the actual focus of this evaluation report was effectiveness and impact evaluation.

Both quantitative and qualitative research design was used specifically survey data and exit interviews from students and focus group data from instructional staff and mentors was used. Data collection and analyses are described below. Findings are discussed in subsequent sections.

Context

In 2012, the Ministry of Health, Uganda in partnership with ICB/BTC? Introduced the eLearning mode of delivery at Health Manpower Development Center (HMDC) an in-service center for continuous Professional Development in the country. This was aimed at increasing access of health workers to Training programs with minimal interference of health service delivery. Leadership and Management of health facilities, a six months course was the

first to be delivered using the eLearning platform. The leadership training program was given first priority because of inadequacy of the streamlined health curriculum in universities and institutions to train leadership and management skills in Uganda (MOH TNA Report 2010). The program has been running for 4 years and 3 cohorts have graduated.

Aims and Objectives of the health workers professional development Program

The key objectives of the program were to:

  i. To build the leadership and Management capacity of health workers in both regions
 ii. Implement a blended learning pilot in the sub regions of the Rwenzori and West Nile.
iii. Increase access of the in-service training programs
 iv. To reduce time spent away from workstations by health workers

1.0 Introduction

In commitment to the improvement of quality learning and teaching in courses taught at in-service training, evaluation is a necessary component (Johnson, 2010). This evaluation report is organized based on the three major steps of planning an evaluation as stipulated in the "Research and evaluation in educational and psychology article". These include; focusing, planning and implementing an evaluation. The focus of the report was on the evaluation of the effectiveness and impact of blended learning in terms of suitability of the eLearning platform, face to face component and transfer of what has been learnt to practice by health workers.

1.1 Objectives of the evaluation

The blended learning mode was evaluated to make decisions on its adaptability in training health workers in the rural setting and securing further funding from the ICB/ BTC. However it's important to note that evaluation is just one source of influence on decision making, and that a great deal of negotiating and dealing with local politics are necessary before any action results from effectiveness evaluation (Patton 1997) (cited byReeve & Hedberg, 2003). The overall purpose of the effectiveness and impact evaluation was to determine whether the blended learning mode accomplished its objectives within the context of its implementation (Reeve & Hedberg, 2003) and whether there was transfer of skills. The following variables were evaluated; the level of interactivity of student- tutor- content, the pedagogical dimension and the perceptions/ satisfaction of the learner as these constitutes learning using interactive learning systems.

1.2 Scope of the evaluation

The major stakeholders in the evaluation were the students/ learners, tutors, mentors, project officer, hospital management and Ministry of Health (MOH) and the development agencies.

1.3 Opportunity and Constraints/limitations

The opportunity in the evaluation process was that a pilot was conducted; a pilot was conducted in Moyo district then the program was rolled out in the Rwenzori (7 Districts) and West Nile (7 Districts) sub regions of Uganda.

The constraints in the evaluation process was inadequate time for data collection and analysis, Funds, Inadequate Documentations on the project and willing sample space for interviewing. In case of publishing, the authorization of the permeant secretary of MOH shall be required.

1.4 Evaluation questions

1. What is the level of interactivity between the tutors- students- content?
2. How were the knowledge, skills and attitudes of the learners changed by the training?
3. What level of satisfaction do the learners express about the training program?
4. What are tutors reactions to blended learning program?
5. How does blended e-learning training reduce health workers' time away from work station?
6. How reliable was the ICT infrastructure?

2.0   Evaluation Approach and Methodology

2.1   Evaluation Approach
2.2   Overview of Evaluation Model

According to Harding**,** Kaczynski and Wood (UniServe Science Blended Learning Symposium Proceedings) Blended learning is a mixture of online and face-to-face learning using a variety of learning resources and communications options available to students and lecturers. Blended learning, programmes of education differ from face-to-face (f2f) educational models, and as such require different strategies to successfully meet the educational outcomes (Tokmak, Baturay, & Fadde, 2013). However, there is no such thing as a "perfect teaching model" (Lee, 2008). Although there may not be a 'perfect model', there is need of evaluating the effectiveness of a program, and the teaching pedagogy adopted.

Literature highlights different frameworks for evaluating blended learning; Frameworks such as the radar highlights six radials for evaluating the blended learning in mathematics courses; Dynamics and Access, Assessment, Communication, Richness and Independence (Harding, Engelbrecht, Lazenby and le Roux, 2005); Blended Learning evaluation rubric (BLeR)(Smythe,2012) which assists in the design, redesign, or evaluation of blended and online courses; the interactive learning systems evaluation model (Reeves & Hedberg, 2003) which analyses blended learning using the ten (10)pedagogical dimensions. According to Clark, 1992, (cited by Reeves & Hedberg, 2003) " developers and managers of interactive learning systems fail to conduct evaluations at all or focus on evaluating the delivery of system per se rather than the actual pedagogical or instructional design of the blended system being evaluated.

For this evaluation exercise, the pragmatic paradigm was adopted because of the need for decision making. According to Reeves & Herderg(2003), the pragmatic paradigm specifically the Eclectic – mixed methods is the most

appropriate for evaluating eLearning mode of delivery because of its capability of handling the complexity of technology (Casti,1994, Pascale, Millerman & Gioja 2005, Sedgwick,1993) (cited by Reeves & Hedberg, 2003). According to Reeves & Hedberg *(2003),* the eclectic aspect of the Eclectic – Mixed Methods Pragmatic paradigm (EMMPP) refers to its openness of borrowing methods of other three paradigms to collect data and solve problem. The mixed methods aspect recognizes the multiple perspectives in triangulating information and conclusion regarding the complex phenomena. According to Reeves, instructional designers are more concerned with models rather than paradigms because paradigms are general orientations towards inquiry while models will specify and prescribe what exactly the evaluator does (Alikin & Elleh, 1990) (cited by Reeves & Hedberg, 2003). It with from the above background that the interactive learning system evaluation model has been chosen for this evaluation process. The model maps perfectly well with the instructional design model that is followed when developing eLearning programs; this illustrated bellow;

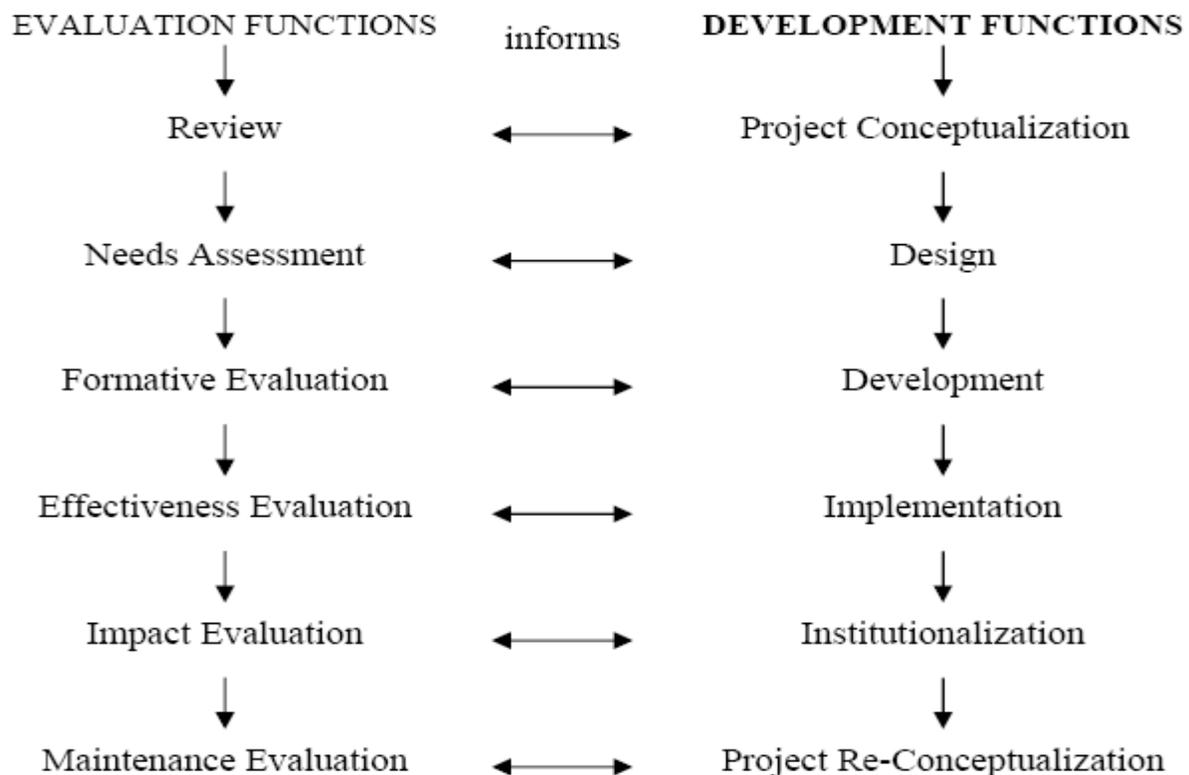| EVALUATION FUNCTIONS	informs	DEVELOPMENT FUNCTIONS
Review	⟷	Project Conceptualization
Needs Assessment	⟷	Design
Formative Evaluation	⟷	Development
Effectiveness Evaluation	⟷	Implementation
Impact Evaluation	⟷	Institutionalization
Maintenance Evaluation	⟷	Project Re-Conceptualization

Figure 1: Relationships among Evaluation and Development Functions (Reeves & Hedberg,2003, p. 55)

In reference to the above illustration, the evaluation model consists of five stages; Review, Needs assessment, formative evaluation, effectiveness evaluation, impact evaluation and maintenance evaluation implying that each stage of the eLearning cycle is aligned to specific evaluation procedure. The paper focused on evaluating the effectiveness and impact of blended learning mode of delivery at HMDC using the ten (10) pedagogical dimensions. However the evaluator briefly presents the evaluation procedures done at the prior stages of the development mode of the blended learning mode of delivery namely; Review, Needs assessment, and the formative evaluation before focusing on the effectiveness and impactevaluation of the blended learning.

2.1.1 Review

Before starting the eLearning program, there was a review exercise; a Staff capacity assessment at HMDC was implemented. The report recommended a course on developing and implementing online teaching and learning of HMDC staff. A Junior Technical Advisor was hired to provide technical support and to conduct on the job training for the staff at HMDC. The Four Senior Health Training Officers at HMDC and One IT staff at Human Resources for Health Development Division (HRDD - MoH) underwent several trainings and orientations. These included among many, a one-week training on virtual teaching and learning at Virtual University Uganda and attending (5) short online courses provided by Coursera. With guidance from the Junior Technical Advisor, the paper based leadership and management of health facilities distance learning course materials were converted to blended learning design.

2.1.2 Needs assessment

This was followed by the needs assessment stage; during an advocacy and sensitization of the eLearning program HMDC faced a number of questions such as: How does blended e-learning training reduce health workers' time away from work station? How does it provide quality in-service training as compared to the traditional paper based distance learning? How does it increase access of health workers to in-service training programs at HMDC? How can eLearning ensure acquisition of skills? Will eLearning be acceptable by health workers given the fact that a majority of them are computer illiterate?

2.1.3 Formative evaluation

The formative evaluation occurred during the pilot. A total of 14 learners from the pilot cohort successfully completed the course in Moyo district. Upon successful completion of the pilot study, the program was scaled up to cover all the fourteen districts in the West Nile (2011) and Rwenzori (2013) sub-region. Mentors were identified among the successful graduates in the two regions.

2.1.4 Effectiveness evaluation

This paper focused on the effectiveness and impact evaluation of the blended learning at HMDC. The major objective of effectiveness evaluation was to enable decision making on the adaptability of mode for in-service training at HMDC. The blended learning mode at HMDC is composed of the eLearning platform and face to face component. HMDC uses a MOODLE platform for teaching/learning and has various functionalities such as the discussion forums, the weekly tutor marked assignment, and self-study instructional materials. Learners are expected to use the platform for learning at least one(1) a day for sufficient learning or benefiting from the learning process, it therefore important for pedagogical aspect of the system to be evaluated.

Effectiveness evaluation enables the evaluation of outcomes of the blended learning *(Reeves & Hedberg,2003)*. According to Philips, Kenney &McNaught (2012), the study of the effectiveness of an eLearning environment illustrates how learners engage with the designed learning process. There is always variations in skills, attitudes and knowledge acquisition of the learners. According to Reeve & Hedberg (2003), the overall purpose of effectiveness evaluation was to determine whether an interactive learning system accomplishes its objectives with in the immediate or short term context of its implementation i.e. enabling learning to take place. The variables on the effectiveness evaluation included; the pedagogical dimensions and the perception of students and tutors about blended learning

2.1.5 Impact Evaluation

The major objective of impact evaluation was to "determine whether the knowledge, skills, and attitudes learned via eLearning platform transfer to the intended context of use" (Reeves & Hedberg, 2003). This involved establishing that whether what had been taught was actually applied to the real world. Evaluation questions such as "*How did the training of health workers on leadership and Management improve the management of health services in sub regions of West Nile & Rwenzori?" "Does blended e-learning training reduce health workers' time away from work station?* "

The main purpose of the impact evaluation was to find out the degree of difference/derivation between, the knowledge, skills and attitude possessed before the instruction and after; Establishment of the above paradigm in this paper was explored using the comments the learners provided on what they like or disliked and what needs improvement or needs to be removed from the blended learning mode of delivery.

3.0　Evaluation Methodology

Given the above background, this paper sought out to specifically investigate the effectiveness and impact of the blended learning mode of delivery at HMDC

3.1 Data Collection Method and Analysis

The evaluation process employed data collection methods (Reeves & Hedberg, 2003);

1. Analysis of the instructional materials on the MOODLE platform
2. Students questionnaires
3. Interviews with key staff
4. Observations

Analysis of the instructional materials on the MOODLE platform was done to establish the pedagogical aspect of blended learning.

The pedagogical dimension of the blended learning mode at HMDC was collected and analyzed using the interactive learning system framework (Reeve& Hedberg, 2003). The analysis was done for both the eLearning and face to face components of the blended learning system using the ten (10) pedagogical dimension; Pedagogical Philosophy, Learning Theory, Goal Orientation, task Orientation, Source of motivation, Teacher role, Metacognitive support, Collaborative Learning, Cultural sensitivity and Structural flexibility (Reeve& Hedberg, 2003).

Staff Interviews

The staff interviews were carried out to ascertain the acceptability and usability of the blended learning mode of delivery. The key staff involved in the development and the delivery of the blended learning at HMDC were phoned and interviewed with open ended questions. (See appendices for topic list). The interviews were flied and analyzed using the SPSS

Student Questionnaire

Student questionnaires were used to establish the perception and satisfaction of learning in a blended learning environment. Questionnaires were emailed to the learners that had completed the eLearning program in Leadership and Management at HMDC. A sample of thirty (30) respondents was taken from Moyo district, the Rwenzori and West Nile sub regions of Uganda. Learners were chosen randomly from each of the seven (7) districts in the West Nile and eight (8) districts in the Rwenzori. They were interviewed on phone because none of them returned the filled questionnaire. The data collected was analyzed using SPSS in four themes; the perception of the learners on the eLearning system, the level of interaction between the learners- tutor – content interaction, infrastructure and accessibility.

Observations

Observations were carried to ascertain the actual reality on ground without necessary interacting with formal structure. Observations were done during the midterm reviews at the work stations of the learners and viewing of reports documented after fellow up visits to the learners. The data collected under observation was qualitative.

4.0 Findings and Discussions
4.1 Findings and Discussions- effectiveness evaluation

This section presents the findings. The findings are presented in two dimensions; the instructional pedagogical dimension and the perception of both the learners and the tutors on the teaching and learning on the eLearning platform at HMDC.

4.1.1 Reeves' 14 Pedagogical dimensional model

Using the Reeves' 14 Pedagogical dimensional model of evaluating the interactive learning system, this evaluation process gathered data on four categories as suggested by Reeves; knowledge, skills, attitude, appeal and

implementation. However, to ascertain that the eLearning platform at HMDC enabled knowledge, skills and attitude acquisition besides being well implemented, there was need to focus on pedagogical dimensions (Reeves & Harmon, 1994) (cited Johnson, 2010).and as a result, the following learning parameters were studied to establish that "learning took place on the eLearning platform";

i. Pedagogical Dimensions of the eLearning system (Interactive Learning Systems(ILS))

ii. Pedagogical Analysis of e-Learning in the leadership and management course

iii. Pedagogical Analysis of Face-to-Face Teaching in the leadership and management course

The ILS dimensions proposed by Reeve and Hedberg (2003)was used to analyze the Pedagogical approaches adopted for teaching and learning during the eLearning and face to face sessions of the "Leadership and Management" course at HMDC;

The *figure1*, below shows the proposed Pedagogical dimensions of an interactive learning system as proposed by Reeve & Hedberg, (2003) and figure 2 and 3 show the simulation of the both the eLearning and face to face sessions as seen from the lenses of Reeve & Hedberg, (2003)

Reeve and Hedberg (2003) model illustrates an evaluation framework for assessing the effectiveness of the eLearning system based on 10 Pedagogical Dimensions. The framework is presented as a two-ended continuum with contrasting values at either end(Reeve and Hedberg, 2003 p191) as shown in the figure: 1, below;

	Pedagogical Philosophy	
Instructivist	←————————→	Constructivist
	Learning Theory	
Behavioral	←————————→	Cognitive
	Goal Orientation	
Narrow Focus	←————————→	General
	Task Orientation	
Academic	←————————→	Authentic
	Source of Motivation	
Extrinsic	←————————→	Intrinsic
	Teacher Role	
Didactic	←————————→	Facilitative
	Metacognitive Support	
Unsupported	←————————→	Integrated
	Collaborative Learning	
Unsupported	←————————→	Integral
	Cultural Sensitivity	
Insensitive	←————————→	Respectful
	Structural Flexibility	
Fixed	←————————→	Open

Figure 1: Pedagogical Dimensions of Interactive Learning Systems (Reeves & Hedberg,2003, p. 191)

The above framework was used to study and simulate the pedagogical dimensions for both the eLearning and face to face sessions at HMDC as shown below. The figure: 2, shows the pedagogical dimension of the instructional materials as presented on the eLearning platform and figure: 3, is a representation of the teaching and learning approaches used during the face to face session for the blended program in "Leadership and Management" at HMDC. The findings shown in this section were supplemented by the learners' and tutors' perception of teaching and learning on the eLearning system.

	Pedagogical Philosophy	
Instructivist	←————————→	Constructivist
	Learning Theory	
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Unsupported	←————————→	Integrated
	Collaborative Learning	
Unsupported	←————————→	Integral
	Cultural Sensitivity	
Insensitive	←————————→	Respectful
	Structural Flexibility	
Fixed	←————————→	Open

Figure 2: Pedagogical Dimensions of eLearning platform at HMDC

	Pedagogical Philosophy	
Instructivist	←——————————→	Constructivist
	Learning Theory	
Behavioral	←——————————→	Cognitive
	Goal Orientation	
Narrow Focus	←——————————→	General
	Task Orientation	
Academic	←——————————→	Authentic
	Source of Motivation	
Extrinsic	←——————————→	Intrinsic
	Teacher Role	
Didactic	←——————————→	Facilitative
	Metacognitive Support	
Unsupported	←——————————→	Integrated
	Collaborative Learning	
Unsupported	←——————————→	Integral
	Cultural Sensitivity	
Insensitive	←——————————→	Respectful
	Structural Flexibility	
Fixed	←——————————→	Open

Figure 3: Pedagogical Dimensions of Face to face sessions at HMDC

In reference to the above two figures, both eLearning and face to face sessions at HMDC were grounded in both the instructivist and the constructivist pedagogical philosophy continuum. The instructivist approach aligned perfectly with Terry Anderson in his book "Theory and Practice of Online Learning", chapter 11, where clarifies on the role of the teacher in eLearning as involving direct instruction that makes use of the subject matter and pedagogical expertise of the teacher. The instructional materials at HMDC emphasized learning objectives sequenced in to learning hierarchies representing progression from lower to higher order teaching (Reeves & Hedberg, 2003,

p192). The face to face sessions were basically orientation in nature which also involved dissemination of direct instruction. On the other hand the, instructional materials on the eLearning platform at HMDC, exhibited the constructivist approach as seen from tasks or authentic problems given to the learners to find solutions.

In regards to the learning theory, the eLearning component of blended learning at HMDC leaned towards the behavioral psychology rather than cognitive given the fact that the leadership & Management training was aimed at changing attitudes and behavior of health workers. However the face to face sessions were towards the cognitive because they involved the memorizing of how to use the eLearning system and recalling of individual usernames and passwords.

The goal orientation was narrow for the eLearning as it focused on specifically leadership and management in health facilities while the face the face session was general as the focus was placed on the general use of the eLearning system.

For both figures the *task orientation* was mostly authentic in eLearning and face-to-face sessions, the course basically tested real world situation such as gender mainstreaming, records keeping, holding of monthly meetings etc. while the face to face sessions were about how to post the assignments, studying at a distance etc.

The *source of motivation* during both the eLearning and the face to face session was both extrinsic and intrinsic specifically considering the internet connection, the leaners had been expected to purchase their on computers and modems alongside the inadequately equipped labs at the hospital. Has much as the some learners possessed personal modems, there were still regions where there was persistent unstable internet connections (extrinsic) but there was possibility of downloading the content at the resource center and reading at your own convenient. On the other hand the MOODLE platform at HMDC is

hosted in the United Kingdom, therefore the system was constantly available and reliable

Though the eLearning and face to face modules deployed explicit instructions and were didactic in nature, learners were requested to submit assignments composed in their words; this was an illustration of both the teachers as a facilitator and didactic. According to Bor.ge Holmberg (1989) , the conversational writing style exhibited in the eLearning modules is referred to as "guided didactic interaction," and creates the tutors' presence which keeps the learners focused and awakened as opposed to academic style.

The *metacognitive support* was given in the MOODLE platform through the use of the startup package that guided the learners on how to navigate through the course, this included the number of assignments, discussion questions, quizzes and tutor marked assignments to be attempted for period of the course. The overall story board of the course was indicated plus start up video introducing the tutors. The learners were also assisted on pacing their learning by introducing them to the learners dairy, remainders of upcoming deadlines, calendar dates and announcements. There was also a direct phoning and emailing facility for the learners to the tutors. This is in line with what Nicola (2010) quoted as cited by Ramsden (2003) that "teaching is about organizing students activity and making learning possible "

Collaborative learning was exercised during the discussion forums where the learners were required to contribute to the discussion topics and comment on the posts of their fellow learners. The leadership and Management course consisted of 15 discussion forums which created an enabling environment for collaborative learning throughout the course period and the learners' work place because if the learner needed to implement whatever thy had learnt, there was a need of teaching the teams at workplace for easy of adoptability of

concepts and values i.e. creation of community of learning (Garrison, Anderson, and Archer, 2003). As a result of collaborative, the learners were able to learn negation skills, team work and respect multiple perspectives of the fellow learner. The face to face sessions also allowed for collaborative learning especially during the training of how to use the MOODLE platform, the fast learners were seen to be teaching fellow learners that had not grasped the online concept well. Collaborative learning (Student to student to content interaction) is one of the component of effective learning and if it is high as seen from the eLearning platform at HMDC, then there exists deep and meaningful formal learning. (Anderson, 2003).

Cultural sensitivity is not of high priority as far as Uganda is concerned, though for this particular regions, it was considered because the Leadership and Management training took place in the different ethnic groupings; West Nile and Rwenzori sub regions. The people from West Nile are stronger and working as compared to the ones from the Rwenzori region. This was important to consider the variations while administrating instructions to the different groups. While the learners from West Nile responded diligently, those from the Rwenzori took their time and therefore assignment and discussion forum dates were adjustable accordingly to allow for flexibility.

The *structural flexibility* of the eLearning was open as students could access anywhere and anytime. The learners were able to access the content on both their personal and resource center computers, however, the learners requested that the labs be adequately equipped and more Continuous Professional Development (CPD) centers be open in the different districts in the two sub regions. The learners appreciated the eLearning system but were concerned about the inadequate ICT skills they possessed which negatively impacted on their learning environment. They were also concerned about the unstable internet connections in the regions and the lack of personal computers. On the other hand the face to face was completely fixed and this created a challenge of absentees at the workplace though for few hours but there were some learners

who completely could not attend as per their responsibilities at the hospital. They therefore asked for personal attention which was difficult but was offered by the mentors in the regions as well as fellow learners. Some of the prospective learners who missed the face to face sessions opted to drop off the course.

i. Students questionnaires

Gender of the respondent

The survey asked the respondents to specify their gender and the findings revealed that the males and females were equally represented with sharing 50% *of the total responses.*

Reason for choosing the blended course

The figure below shows the primary reason for choosing the blended program
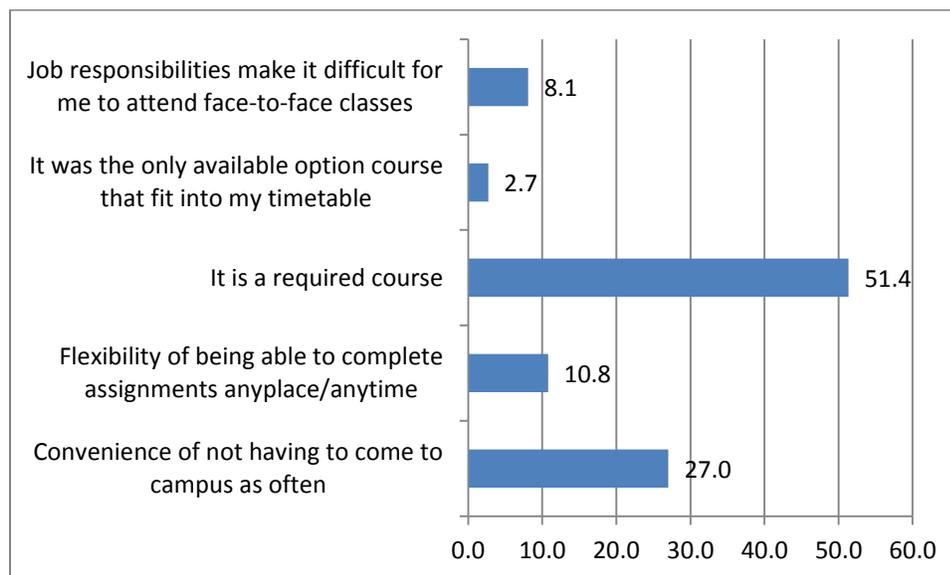
Figure 4: Reason for choosing the blended course

According to figure 4 above, majority of the respondents 51.4% revealed that the major reason for choosing the blended course was that it is a required course and these were followed by 27% who noted that it was "convenient for them not having to come to campus often", the flexibility of being able to complete assignments anyplace/anytime accounted for 10.8% while a few

respondents 8.1% noted that their job responsibilities make it difficult for me to attend face-to-face classes and very few respondents chose the course because it was the only available option course that fit into their timetable.

Infrastructure

The figure below shows the level of satisfaction as regards the infrastructure
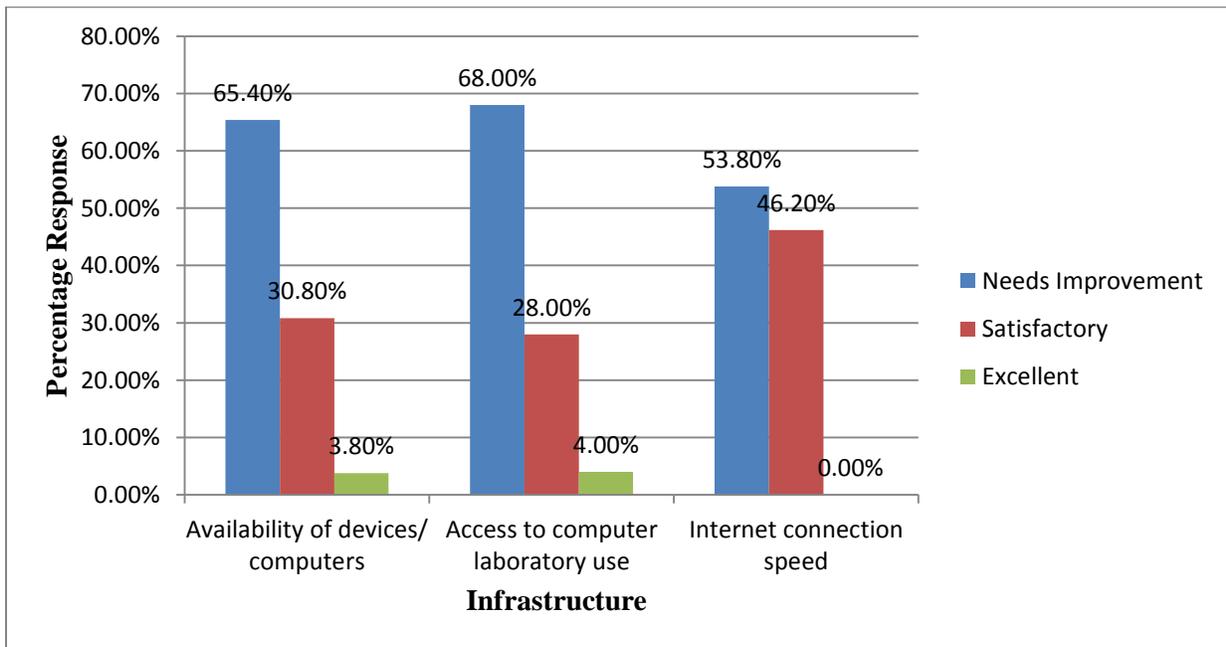
Figure 5: Infrastructure

During the survey, the learners were asked about the infrastructure aspects in relation to the blended online course as shown in the figure 5 below. The findings revealed that most students noted that the availability of devices/ computers needs improvement taking 65.4% of the share while the satisfied students took 30.8% and 3.8% of the students noted that the availability of devices/ computers was excellent.

Access to computer laboratory use needs great improvement as noted by majority of the students 68% while a few students were satisfied with the accessibility to the laboratory and very few 4% found it to be excellent.

A bigger percentage of the students 53.8% revealed that internet connection speed needs improvement. These were closely followed by those who noted that the internet connection speed was satisfactory. However, no student found the internet connection speed to be excellent. This was because the standards of ICT infrastructure in both sub regions is still very low, even the leaners with personal modems sometimes may not access stable internet connection which completely dependent on the internet service providers.

Student – Tutor- Content interaction

Table 1: Student – Tutor Content interaction N (%)

Student – Tutor Content Activities	This is not applicable in the module	This was not done	Rarely	Sometimes	Often	Always
Reply to the forum entries of student	0 (0)	0 (0)	1 (3.8)	3 (11.5)	6 (23.1)	16 (61.5)
Chat with students	0 (0)	0 (0)	1 (3.8)	6 (23.1)	5 (19.2)	14 (53.8)
Update the module	0 (0)	1 (4.2)	2 (8.3)	6 (25)	8 (33.3)	7 (29.2)
Orient and encourage students to the upcoming online session	0 (0)	1 (4)	2 (8)	8 (32)	8 (32)	6 (24)
Discuss in the classroom the performance of the students during the previous online session.	0 (0)	1 (3.8)	11 (42.3)	7 (26.9)	5 (19.2)	2 (7.7)
Discuss in the classroom the level of participation of the students during the previous online session.	0 (0)	2 (8)	13 (52)	4 (16)	4 (16)	2 (8)
Clarify in the classroom the	0 (0)	1 (3.8)	10 (38.5)	9 (34.6)	5 (19.2)	1 (3.8)

misconceptions/misunderstandings of the students with the online content						
Connect the online content/activities to the classroom lessons	0 (0)	2 (8.3)	3 (12.5)	9 (37.5)	7 (29.2)	3 (12.5)

During the survey, the students were asked about the tutor- student- content interaction as shown in the *table 1* above. The findings show that 61.5% of the students always received reply to the forum entries followed by 23.1% who often receive reply, 11.5% of the students sometimes received reply and very few students 3.8% rarely received reply to the forum entries.

Chatting with students has always been done as represented by 53.8% of the total responses, followed by 19.2% of the students who often chat, while 23.1% sometimes chat and 3.8% rarely chat.

24% of the students have been always been oriented and encouraged about the upcoming online session while 8% noted that it was rarely done and 4% noted that it was not done.

Classroom discussions about the performance of the students during the previous online session was rarely done as revealed by most students 42.3%, followed by 26.9% who noted that the discussions were sometimes done 19.2% noted that they were often done and a few noted that the discussions were always done. However, very few respondents noted that the discussions were not done.

Majority of the students 52% revealed that the classroom discussion about the level of participation of the students during the previous online session was rarely done.

Clarification in the classroom about the misconceptions/misunderstandings of the students with the online content was rarely done as noted by most respondents 38.5%, these were closely followed by respondents who noted that clarifications are sometimes done, yet 19.2% noted that they are often done.

The module is often updated as revealed by the majority of students 33.3% and these are closely followed by students who noted that the module is always updated 29.2%, 25% of the students noted that it is sometimes updated while 8.3% noted that the module is rarely updated and very few students 4.2% revealed that this was not done.

A bigger percentage of students have revealed that connection of the online content/activities to the classroom lessons has been sometimes done yet 29.2% reveal that it has been often done and very few 3.8% noted that it was not done.

The survey further revealed that the student – tutor -content interactions were evident in most of the modules undertaken by the students, however there was need for the continuous updating and supplementing of the instructional materials with current references, videos, audio and strengthening of the mentorship function. Furthermore, the students needed constructive feedback as far as their performance was concerned.

Student – Tutor- Content interaction

Figure 6: Student – Tutor Content interaction
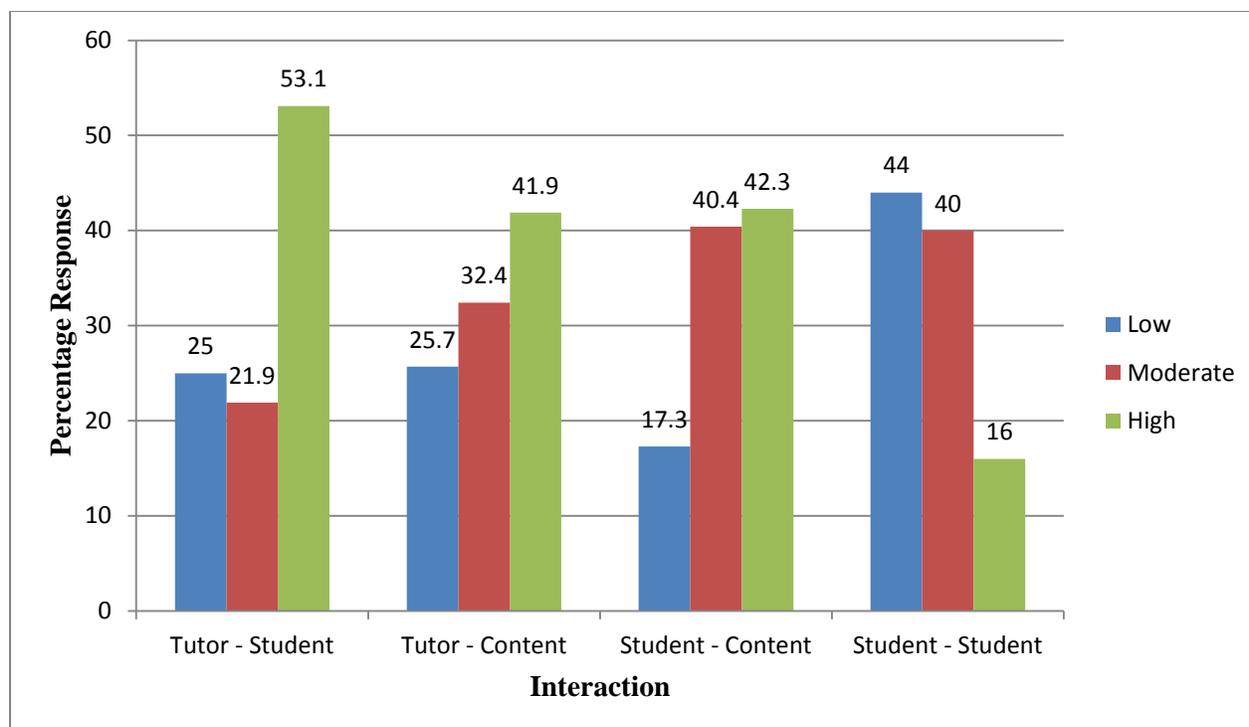
As shown in the figure 3 above the student – tutor content interaction was assessed and the results revealed that most students 53.1% noted that the tutor student interactions were high and these were followed by 25% of the students who noted that they were low and 21.9% noted that the interactions were moderate.

The tutor – content interactions were high according to 41.9% of the total responses and these were followed by 32.4% who said they were moderate and 25.7% noted that they were low

Majority of the students 42.3% revealed that the student content interactions were high and these were closely followed by 40.4% who revealed that the interactions were moderate while very few students 17.3% found the interactions to be low.

The student – student interactions were low as indicated by most students 44% yet 40% of the students noted that they were moderate and very few students 16% found them high.

From the graph above its evident that students – content interaction was rated highly as compared to the student –tutor & student – student & tutor – content interactions. The analysis showed that there was high levels of more than one of these three interaction modes(student–teacher; student–student, or student–content) at HMDC, specifically student–teacher & student–content interaction modes were high, implying that there was a more satisfying educational experience, with deep and meaningful formal learning(Miyazoe and Anderson, 2012). However, there is a need for increasing the level of interactivity between the students to content through the integration videos, audio and the practical aspect.   Furthermore, an inclusion of collaborative and authentic learning tasks will increases student – student interactivity.

Student perception about the blended online course

Table 2: Student perception about the blended online course N (%)

Blended online course item	Needs Improvement	Satisfactory	Excellent
Ease of using moodle	3 (11.5)	16 (61.5)	7 (26.9)
Value of online learning materials available (lectures and handouts)	2 (7.7)	17 (65.4)	7 (26.9)
Relevance of online activities (assignments and quizzes)	2 (7.7)	18 (69.2)	6 (23.1)
Level of online interactions with the teacher (teaching presence)	20 (76.9)	5 (19.2)	1 (3.8)
Level of online interactions with other students (social presence)	11 (44)	10 (40)	4 (16)
Performance of student assistants (SAs)	10 (40)	13 (52)	2 (8)
Availability of devices/ computers	17 (65.4)	8 (30.8)	1 (3.8)
Access to computer laboratory use	17 (68)	7 (28)	1 (4)
Internet connection speed	14 (53.8)	12 (46.2)	0 (0)
Overall satisfaction	10 (40)	13 (52)	2 (8)

Table 2 above shows the students' perception about the blended online course and findings revealed that majority of the students 61.5% found use of moodle

to be satisfactory while 26.9% of the students noted that the use of moodle was excellent and very few students 11.5% needed improvement in using moodle implying the need of continuous ICT training for the learners.

A bigger percentage of students 65.4% were satisfied with the value of online learning materials available (lectures and handouts) yet 26.9% of the students found the materials to be excellent and very few students 7.7% noted that the online materials needed improvement specially, the learners wanted the content to be supplemented with Audio and videos to improve their conceptualization of the learning materials.

Most students 69.2% were satisfied with the relevance of online activities (assignments and quizzes) while 23.1% of the students indicated that the online activities (assignments and quizzes) were excellent and 7.7% noted that they needed improvement.

Nearly 77% of the students revealed that the level of online interactions with the teachers (teaching presence) needed improvement while 19.2% noted that the interactions were satisfactory and only 3.8% of the students found the online interactions with the teachers to be excellent.

The findings further showed that the level of online interactions with other students (social presence) needed improvement as noted by majority of the students 44% while 40% noted that the online interactions with other students was satisfactory and 16% found the interactions to be excellent.

The performance of student assistants was satisfactory as indicated by majority of the students 52% yet 40% noted that the performance needed improvement and very few students 8% found it to be excellent.

The highest proportion of students 65.4% mentioned that the availability of devices/ computers needed improvement while 30.8% found it satisfactory and 3.8% noted that the availability of devices/ computers was excellent.

Access to computer laboratory use required improvement according to 68% of the students yet 28% were satisfied and 4% found access to computer laboratory use to be excellent.

Internet connection speed requires improvement as revealed by most students 53.8% while 46.2 of the students are satisfied with the speed and no one found the speed to be excellent.

Overall satisfaction of the blended learning course

The students were asked to give information about their satisfaction with the blended learning course. The findings show that overall the more students are satisfied with the blended online course as noted by the majority 52% yet 40% highlighted that the course required improvement and very few students 8% found the course to be excellent.
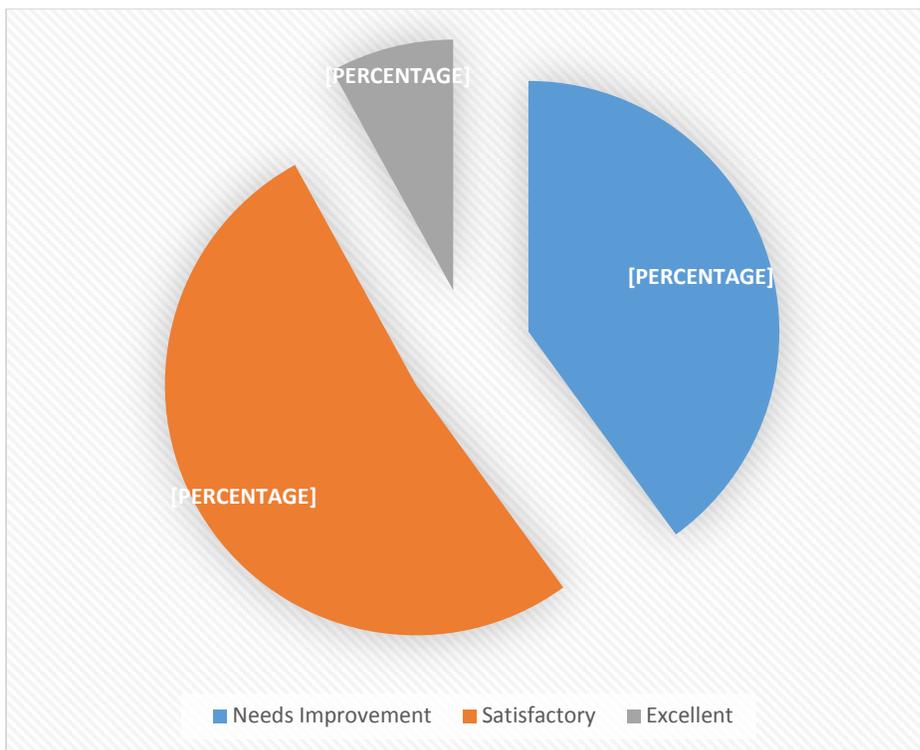
Figure 7: Overall satisfaction of the blended learning course

The leaners were satisfied with the flexible nature and convenience of blended learning, strong students support structures by both the tutors and the

mentors, acquisition of knowledge, skills and attitude etc. this was evident that blended learning reduced time spent away from the worker station for the health workers in pursuit of continuous professional development and allowed for knowledge, skills and attitude acquisition.

ii. Staff interviews

The comments below constitute the tutors perception of blended learning at HMDC:

The introduction of blended learning has improved my research, writing and computer skills, as i interact more with learners and the eLearning platform, I develop confidence in the use of web for research

Blended learning is flexible, you can work anywhere and any time

Resources are scarce, there is inadequate time and funds to travel throughout the districts for follow up of the learners

The need for improvement of the ICT infrastructure and ICT capacity for both the tutors and the leaners

3.2 Findings and Discussions- Impact evaluation

During the survey, the students were asked to give feedback regarding what aspect they liked or disliked most on the blended learning course and findings were as follows in the *table 3* below.

The findings from the students feedback was used in establishing the strength and weakness of the blended learning at HMDC, the students were basically impressed with overall design of the program but recommended additions such as the inclusion of practical sessions, ICT training etc. findings in this section were communicated to the course convener for attention

Table 3: **Student Feedback**

Liked	Improve	Add	Remove

° All course units were effective	° Course units deducted and wonder what happened.	° Send some videos in teaching.	°
° References on internet.	° Response to the colleagues who missed a lot on Mark.	° Improve the interaction between the tutor and the student.	
° Discussions/ interactions with mentors.	° Course units that are new to us like financial management	° Need for mentors to work closely with the students' coordinator.	
° Effectiveness depends on each department; communication and customer care were the best	° Course units that are new to us like financial management	° Involve former students.	
° Financial and human resource management	° Delayed responses	° Introduce more training.	
° It is flexible and doesn't pressurize	° Financial management and human resource management were not part of my work so it was difficult for me to catch up but I have a small idea now.	° Linkage with fellow students.	
° It is time saving as one does the course during their free time, so it leaves time for work.		° Provide computers and connectivity	
° Knowledge of leadership and management	° HMIS part	° Tutors should make a follow up.	
° The discussion part of it where by you interact with your friends they learn from you and also you learn from them	° Human rights	° Drop out should find out what happened	
	° It didn't prepare us to face the real management like communication	° An interface with the facilitators.	
° The performance and release of exams	° It is sometimes boring reading alone	° Computer illiterate people don't gain.	
° You do it at your convenience	° Some course units didn't have detailed literature	° Ample time should be given don't rush	
° You read at your own convenience	° Poor internet connection	° Demands a diploma	
	° Linkages with fellow students	° Handouts to be circulated to learners	
	° The financial was	° Higher education of learning should make it compulsory for people in the medical field.	
		° If there are other courses like gender they can help us on our C.Vs	
		° Improve on the network	
		° Need for the	

	a bit challenging because of my medical background ° There were no practical approaches ° When you fail to understand a concept you can't easily ask from the teacher there and then	practical part of it to be introduced ° Spare some time for tutorials (face to face) ° There are delays with the administrators ° Tutors take long to meet with the students. ° The practical part of it should be strengthened. ° You should improve on the network connectivity	

Furthermore, the survey required the students to state other experiences and outcomes achieved during the course of their blended learning program and data was collected qualitatively as shown in Appendix 3; It was evident that blended learning was at a greater extent been accepted and was impacting the Knowledge skills and attitudes of the health workers not just for the leadership & Management but also the capacity of using computers and the internet improved. See comments below from a few respondents;

"Generally it has improved my managerial skills as a medical personnel"

"I had an opportunity to learn new things; making the work plan for the health center and the vote controlling financial part of it. - Sharing with my colleagues."

"It has taught me behavior aspects, how to deal with categories of HRM"

"The course is very ok and necessary especially for public managers".

"It was too good and has helped me a lot, communication and customer care were relevant"

Flexibility – Access and computer skills

4.0 Conclusions

In conclusion, blended learning at HMDC enabled learning to take place as seen from the pedagogical dimension (Reeves & Hedberg, 2003), the instructional material design, eLearning and the face to face components achieved the minimum criteria of an enabling environment for learning as asserted by (Anderson, 2003). Clark (1992) asserts that blended learning creates an enabling learning environment if the attention is paid to the actual pedagogical or instructional design of the blended system rather than the medium of delivery of the system.

The analysis showed that there was high levels of more than one of these three interaction modes(student–teacher; student–student, or student–content) at HMDC, specifically student–teacher & student–content interaction modes were high, implying that there was a more satisfying educational experience, with deep and meaningful formal learning(Miyazoe and Anderson, 2012). However, there is a need for increasing the level of interactivity between the students to content through the integration videos, audio and the practical aspect. Furthermore, an inclusion of collaborative and authentic learning tasks will increases student – student interactivity.

There was an overall satisfaction of blended learning by both the tutors and leaners. The leaners were satisfied with the flexible nature and convenience of blended learning, strong students support structures by both the tutors and the mentors, acquisition of knowledge, skills and attitude etc. this was evident that blended learning reduced time spent away from the worker station for the health workers in pursuit of continuous professional development and allowed

for knowledge, skills and attitude acquisition. The tutors were satisfied with blended learning at HMDC as it improved their research, writing and computer skills

ICT infrastructure (internet connection & computers) is a very significant component of blended learning. While there was a provision for the hosting of the MOODLE platform in the UK, the learners were very frustrated with the unstable internet connection, inadequately equipped labs and ICT hands on skills. Much as blended learning was achieving it implementation objectives, the poor ICT infrastructure over shadowed the good and at one time, blended learning at HMDC was rebelled "rudimentary eLearning".

5.0 Recommendations

There is therefore a need for MOH to establish   better equipped resources centers in the different districts so as to improve on the ICT infrastructure and hence increased accessibility of the blended learning programs at HMDC

There is need for HMDC to improve the level of interactivity in their instructional materials by integrating videos, audio, practical aspect, collaborative and authentic learning tasks as well as improvement of the mentorship function.

There is need for establishment of a Monitoring and evaluation mechanism to guide the quality of the blended learning mode specifically; instructional material/ content development, student support structures and online platform hosting and maintenance as well as facilitators' capability (Smythe, 2012). The adaptability of interactive learning system evaluation approach (Reeves & Hedberg, 2003), would be very appropriated for HMDC because of the infancy of blended learning at the center, using this evaluation approach will enable the testing of every stage of eLearning implementation.

The Leadership and Management training program should be reviewed and developed into a diploma certificate with great attention to the pedagogical dimensions and roll it out to all the health facilities in the country.

The need to adopt blended learning mode of delivery as a methodology of training health workers

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Appendix 2

Questionnaires

Please answer this short survey about your experiences with the blended learning course/s so far. Your responses will be treated with utmost confidentiality. Thank you.

1. Gender:

○ Male

○ Female

2. Where do you usually access MOODLE?:

○ Inside the campus in the computer laboratory

○ Inside the campus using the netbooks in the library

○ Inside the campus using my own device/computer

○ Outside the campus renting a device/computer

○ At home using my own device/computer

3. On the average, how long do you access your MOODLE course?

○ less than 15 minutes

○ 15-30 minutes

○ 30-60 minutes

◉ 1-1.5 hours

○ more than 1.5 hours

4. What was your primary reason for choosing this blended learning course?

_ Convenience of not having to come to campus as often

_ Flexibility of being able to complete assignments anyplace/anytime

_ It is a required course

_ It was the only available option course that fit into my timetable

_ I chose the instructor, not the course modality

_ Job responsibilities make it difficult for me to attend face-to-face classes

Rate the following items in relation to your blended learning course/s:

	Needs Improvement	Satisfactory	Excellent
Ease of using moodle	○	○	○
Value of online learning materials available (lectures and handouts)	○	○	○
Relevance of online activities (assignment and quizzes)	○	○	○
Level of online interaction with the teacher (teaching presence)	○	○	○
Level of online interaction with other students (social presence)	○	○	○
Performance of student assistants (SAs)	○	○	○
Availability of devices/computers	○	○	○
Access to computer laboratory use	○	○	○
Internet connection speed	○	○	○
Overall satisfaction	○	○	○

How often were the following activities done by the teacher in connection to your blended learning course/s?:

	This is not applicable in the module	This was not done	Rarely	Sometimes	Often	Always
Reply to the forum entries of student	◯	◯	◯	◯	◯	◯
Chat with students	◯	◯	◯	◯	◯	◯
Update the module	◯	◯	◯	◯	◯	◯
Orient and encourage students to the upcoming online session	◯	◯	◯	◯	◯	◯
Discuss in the classroom the performance of the students during the previous online session	◯	◯	◯	◯	◯	◯
Discuss in the classroom the level of participation of the students during the previous online session	◯	◯	◯	◯	◯	◯
Clarify in the classroom misconceptions/misunderstandings of the students with the online content	◯	◯	◯	◯	◯	◯
Connect the online content/activities to the classroom lessons	◯	◯	◯	◯	◯	◯

7. What was the **most** effective aspect of this blended learning course?

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………

8. What was the **least** effective aspect of this blended learning course?

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9. What advice would you give to a student considering a blended learning course for the first time?

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10. What suggestions can you provide to help strengthen this blended learning course?

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Other comments about your experience of the blended learning course/s so far:

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Appendix 2

Interviews for Tutors

What is your understanding of blended learning?

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Do you think your level of technology knowledge is sufficient for teaching a blended course? Why or why not? (Lecturers

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....

How has the introduction and implementation of blended learning in the HMDC influenced your decision to engage or not to engage in blended learning?

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Do you think that HMDC has an enabling structure for the implementation of blended learning? Why or why
not?...
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What do you perceive to be the benefits of using blended learning in in-service training?...
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....

What is your perceived level of difficulty of using blended learning?

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What are your recommendations for the improvement or adoption of the implementation of blended learning at HMDC?

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Appendix 3

Other comments about your experience of the blended learning course/s so far:
- Very interesting and keeps on updated. - Most of the modules we did in school.
-Flexibility - Access
-The course content was well tailored to the needs of the learners.-I learnt computer skills.
Generally it has improved my managerial skills as a medical personnel
Generally the course is interesting
Good course
Helpful but demands the practical part of it
I had an opportunity to learn new things erg making the work plan for the health center and the vote controlling financial part of it. - Sharing with my colleagues.
I learnt from fellow students a lot that I didn't know
It has added a lot on my skills and has helped me manage people well.
It has improved my financial and managerial skills as a medical worker.
It has improved my management skills
It has improved my skills in management
It has taught me behavior aspects, how to deal with categories of HRM
It is recommended and very relevant.
It is very relevant and it has increased on my level of understanding and managing issues
It was too good and has helped me a lot, communication and customer care were relevant
Its good and improves the skill
it's very relevant
The course has helped me a lot and am appreciating its relevancy
The course is generally relevant.
The course is very ok and necessary especially for public managers.
The ones who have finished should convince other members to join.
Timelines for doing online tests should be extended a bit.- Question are not exhaustive.
Very grateful and happy because you improved my knowledge