Assessing the Feasibility of Utilizing eLearning Content in Midwifery Schools in Ghana

Authors:
Alison R. Trump
Catherine Carr

Contributors:
Martha Appiagyei
Christina Maly
Sarah Searle
Richard Okyere Boadu
Chantelle Allen
Heather Harrison

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Abbreviations and Acronyms

CITI	Collaborative Institutional Training Initiative
eLearning	Electronic learning Ethical Review Committee
GHS	Ghana Health Services
GIFEC	Ghana Investment Fund for Electronic Communications
GLO	Global Learning Team
GoG	Government of Ghana
HIV	Human immunodeficiency virus
ICT	Information Communication Technology
ICT4D	Information and Communication Technologies for Development
IT	Information Technology
JHSPH	Johns Hopkins Bloomberg School of Public Health
MCHIP	Maternal and Child Health Integrated Program
MDG	Millennium Development Goal
MoH	Ministry of Health
MTS	Midwifery training school
NMC	Nursing and Midwifery Council
Skoool™HE	Skoool™ Healthcare Education
SOP	Standard Operating Procedure
UNDP	United Nations Development Program
UNFPA	United Nationals Population Fund
USAID	United States Agency for International Development

Executive Summary

INTRODUCTION

This report describes the implementation of a pilot project to evaluate the feasibility of using electronic learning (eLearning) as a support for education in midwifery training schools (MTSs). Ghana has a documented shortage of health care workers, in particular midwives. The Government of Ghana (GoG) has opened several new midwifery training schools in the last several years. Despite the substantial increase in the student population with the addition of new schools and larger cohorts per school, output of newly licensed midwives has not met the need of the country. This has been partially attributed to the low pass rate of the licensure examination. To address the low pass rate, the Ministry of Health (MoH) has identified the use of eLearning modules to supplement several courses in the pre-service midwifery curriculum.

ELEARNING PROGRAM AND FEASIBILITY STUDY

Funded by the United States Agency for International Development (USAID) flagship program, Maternal and Child Health Integrated Program (MCHIP), an eLearning program was implemented in partnership with the MoH. Intel® provided the free-for-use Skoool™ Healthcare Education (Skoool™HE) platform to host six eLearning modules. Four modules were developed through a partnership between Jhpiego and the United Nations Population Fund (UNFPA) on the following topics: postpartum hemorrhage, pre-eclampsia/eclampsia, prolonged and obstructed labor, and postabortion care. The remaining two modules were designed and created in Ghana as modules specific to the country's context, relating to the reduction of human immunodeficiency virus (HIV) stigma and discrimination and to the identification and management of malaria during pregnancy. These six modules were disseminated to six midwifery schools.

To improve our understanding of the feasibility of implementing an eLearning system in Ghana, a study was conducted to determine accessibility, usability, and acceptability of the modules and the eLearning approach among the students, information technology (IT) tutors, midwifery instructors, and school principals.

RESULTS

A total of 328 midwifery students and 12 midwifery instructors were surveyed. Six IT tutors, five principals, and three members of the MoH IT team participated in in-depth interviews. Across all groups surveyed, acceptability of the eLearning program was evident, with moderate accessibility and usability. More than half of the students reported that eLearning modules helped them to understand target topics. Results showed a significant increase in workload of the MoH IT team and IT tutors at each school. Challenges with systems governance at the schools and server administration prohibited collection of data on student enrollment and usage rates in particular modules.

RECOMMENDATIONS

The feasibility study provided important data on potential recommendations for national scale-up of eLearning in Ghana. Investigators recommend greater institutionalization and governance of eLearning systems, school computer labs, human resources for student user support, and general desktop support issues. Additionally, guidelines on prioritizing eLearning content selection and creation as well as guidelines on how to create content should be developed. The investigators also recommend increased training and systems governance measures be incorporated into scale-up efforts. Finally, future implementations should design rollout to capture the overall impact of eLearning at the following levels: student, licensure examination, and clinical practice and health outcomes.

Introduction

BACKGROUND AND EVIDENCE

Ghana has a documented shortage of health care workers, in particular midwives. The shortage, which includes service providers and teachers, is expected to worsen with a large number of retirements. In order to manage the shortages, a number of new midwifery schools have been opened within the last several years; between 2010 and 2012 the number of midwifery schools and class sizes increased significantly.

In 2010, when the MCHIP program began, there were 28[1] midwifery training schools (MTSs)—18 direct entry and 10 post-basic—in the public sector, with an overall annual intake of 824 students.[2] Since that time, the number of schools as well as class sizes have increased dramatically. There are now 34 midwifery schools, and numbers per class are as high as 470. However, despite the substantial increase in the student population with the addition of new schools and larger cohorts per school, output of newly licensed midwives did not have a comparable increase. In 2011, the pass rate on the midwifery licensure examination was 54%, indicating that a little over half of newly graduated students actually passed the exam. An internal evaluation conducted in April 2013 under the auspices of the Nursing and Midwifery Council (NMC) [1] found that this high failure rate could be attributed to a number of factors at the individual school level and at the licensure level. School level factors included students (inadequate prior educational preparation, absenteeism), midwifery instructors (overwhelming workload compounded by high student/instructor ratios, outdated teaching materials/methods), and resources (outdated and inadequate buildings, lack of and inadequate simulation and computer labs). National level issues included outdated curriculum, no standard for curriculum implementation, and poorly managed licensure examinations by the regulatory agency responsible for the exam. Additional challenges included inadequately trained preceptors and too few clinical sites, resulting in students with insufficient supervised clinical practice time for knowledge and skill acquisition and increased strain on limited existing resources [1].

With increased retirements, the documented shortage of midwives is anticipated to worsen, and examination failures are expected to cause further reduction in the numbers of new midwives ready for deployment. In 2012, the MoH selected eLearning as an intervention to supplement and reinforce lessons learned in the classrooms and skills labs. The United Nations Development Program (UNDP) Millennium Development Goal (MDG) acceleration framework action plan identified eLearning as a key strategy to meet MDGs four[3] and five[4] [2].

LITERATURE REVIEW

Generally, eLearning is defined as "…instruction delivered on a digital device such as a computer or mobile device that is intended to support learning" [3] and can be either online or offline. It is believed that the term originated during the 1980s along with the inception of online learning [4]. The literature often discusses eLearning as a part of distance education, though distance education may or may not include eLearning. The terms distance education and distance learning, often used interchangeably, generally refer to methodology that uses learning materials with students who are not in traditional group-based classroom settings [5]. Best practices for distance learning include a variety of materials specifically prepared for a distance format and a combination of distance and face-to-face learning [5]. This combination of

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[1] This number excludes three newly established post-basic midwifery training schools [6].
[2] As of August 2014, there are 34 midwifery schools, with an estimated 3,750 students enrolled [7].
[3] MDG four is to reduce child mortality [8].
[4] MDG five is to improve maternal health [8].

distance and face-to-face methods is known as blended learning. Blended learning can be defined as utilizing mixed modes of teaching and learning within one learning system [5].

An eLearning platform can be a major component of a blended learning strategy that combines practical skills training and learning in the context of patient care under supervision, and can be an effective training method [5,9,10,11,12] . Blended learning is suggested for health care training because it can respond to the need for hands–on, skills–based training as well as self-directed learning [13,14,15,16,17]. For the purposes of this literature review, blended learning will include eLearning.

Instruction via eLearning has proven to be as effective, or more effective, than face-to-face instruction [18,19,20]. When used as part of a blended learning approach, eLearning can increase learner engagement, is learner focused, is easily updated as new knowledge emerges, and increases access through removal of geographic barriers. In addition, eLearning can increase access to experts [18].

The blended learning approach has become more acceptable in Africa for in-service training [10,13]. However, eLearning usage in pre-service education in developing countries has not been as well documented [21]. The use of eLearning could have significant impact within pre-service education. Using eLearning supports the development of target competencies. The literature supports this claim because a competency-based curriculum[5] is seen as an essential basis for pre-service education [22,23].

Numerous sources suggest a variety of guidelines and best practices for eLearning, though currently there are no globally vetted and accepted standards for eLearning [7,24,25,26]. Distance education quality principles from the University of Wisconsin [27] and guidelines for distance learning from the International Council of Nurses are relevant to eLearning [28]. The needs, capabilities, and context of each country differ, and guidelines must be sufficiently flexible to adapt to a variety of settings.

INNOVATION

Although use of eLearning in medical training programs has been attempted in Ghana, to date, its use as a supportive measure within midwifery education programs has not been documented [29]. Additionally, national level scale-up of an eLearning system of this kind has not been attempted in West Africa. Ghana is an appropriate setting to accommodate this type of scale-up because it has a pre-established curriculum, a licensure examination, and the infrastructure for continued support of such endeavors, as well as the interest and support of the MoH. The context and application of eLearning in this setting is innovative and holds great potential for proof of concept in pre-service education.

A pilot study to assess the feasibility of eLearning implementation was included as part of the project. Institutional Review Board (IRB) applications were submitted to and approved by the Johns Hopkins Bloomberg School of Public Health (JHSPH) and the Ghana Health Services (GHS) Ethical Review Committee (ERC).

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[5] Competency-based curriculum is defined as a set of "…teaching, learning, and assessment activities that are intended to enable students to acquire and demonstrate a predetermined set of knowledge, skills, and behaviors as the outcome of learning [15].

ELEARNING PROGRAM

This eLearning program arose from an identified need for quality improvement in pre-service education within Ghana, specifically motivated by a desire to address the high failure rate of midwifery licensing examinations. The program was implemented in six midwifery schools. The use of eLearning was chosen as an intervention to supplement and reinforce lessons learned in the classrooms and skills labs. The program was funded by USAID's flagship program MCHIP, in partnership with the Ghana MoH. To deploy the eLearning modules, the Intel® free-for-use Skoool™ Healthcare Education (Skoool™HE) platform, was selected. Skoool™HE provides critical value because of its ability to be used both online and offline, an uncommon feature in eLearning systems. A team of five implementers from the MoH with expertise in IT, health information systems, and data management, as well as an IT tutor on staff at each school, were responsible for actual system rollout, including software installation, user account creation and management, and deployment of eLearning content.

An innovative partnership with Intel and Samsung enabled the MoH to pre-finance the purchase of more than 7,000 laptop computers for students and midwifery instructors using an MoH revolving fund. This plan allowed students to purchase and pay off their computers using their monthly stipend over one year.

The Ghana eLearning program has spanned three years. Year 2012 included development of a concept note and work plan along with pilot site selection. Years 2013 and 2014 were focused on implementing the work plan. The work plan was divided into four phases; phases one, two, and three comprised the program's structured introduction (or rollout) to the implementing partners and schools. Figure 1 below is a high-level illustration of the seven key activities that made up the four phases of project implementation.

Figure 1. eLearning Project Activities, 2013–2014
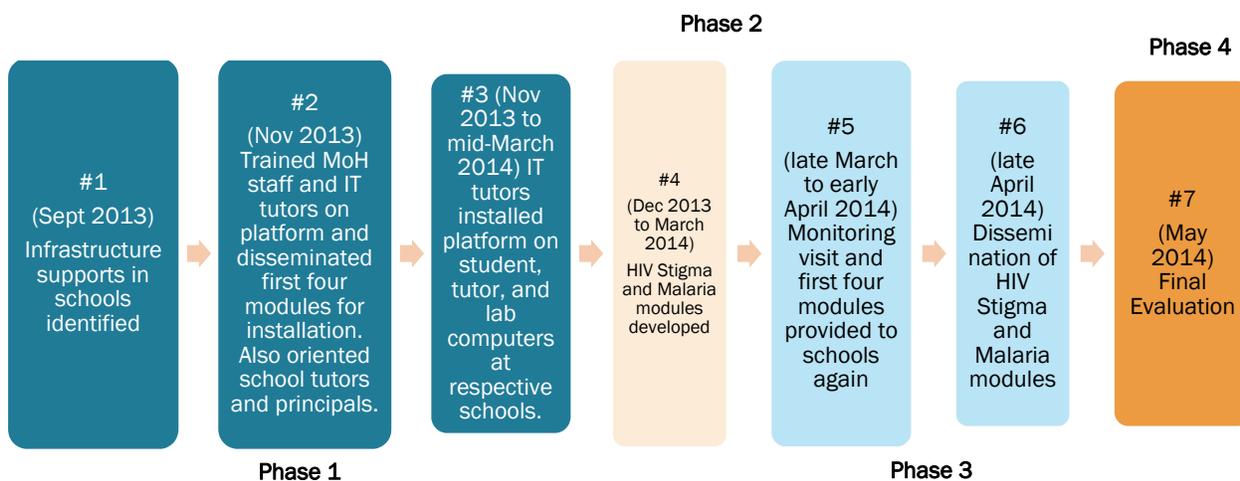
PHASE 1: TRAINING AND PLATFORM INSTALLATION

Phase One focused on understanding potential barriers to eLearning implementation at the six schools, training staff, and installing the platform. Members of the MoH IT team visited the six selected schools to assess infrastructure, computer usage, and resource gaps that may have affected introduction of the eLearning platform. Another activity included an orientation to Skoool™HE and training for the MoH IT staff by Jhpiego on platform use and installation. Support processes for platform introduction were determined and followed a hierarchical order. Midwifery students and instructors reported issues to the schools' IT tutors; IT tutors were

instructed to request assistance from the system administrators who were identified as the MoH IT team. The IT tutors were encouraged to seek help from IT tutor colleagues at the other pilot sites and a Google email group was created to facilitate such communication. During this training, IT tutors were provided the first four UNFPA modules and Skoool™HE platform to begin dissemination efforts at their respective schools. These dissemination efforts carried into early 2014. Together, the MoH IT team, the MCHIP Ghana team, along with Jhpiego's Information and Communication Technologies for Development (ICT4D) staff and Global Learning Team (GLO), introduced the platform to school midwifery instructors and principals and brainstormed module content for the two Ghana-specific modules.

PHASE 2: CONTENT DEVELOPMENT

Phase Two was devoted to content development of two additional modules. A total of six eLearning modules were used in this program. Four were developed through a partnership between Jhpiego and UNFPA on the following topics: postpartum hemorrhage, pre-eclampsia/eclampsia, prolonged and obstructed labor, and postabortion care. The remaining two modules were designed and created in Ghana to be specific to the Ghana context, relating to the reduction of HIV stigma and discrimination and the identification and management of malaria during pregnancy.

PHASE 3: MODULE DISSEMINATION

Phase Three activities focused on monitoring activities at the schools and disseminating the locally developed modules. The first monitoring visit's objective was to understand challenges faced by the schools. The project originally planned to have disseminated the two locally developed modules during this visit, but technical difficulties involving program-to-platform compatibility and procurement of software for module packaging delayed the launch. During this visit, MoH IT staff worked to address technical issues faced by schools and re-imported the four UNFPA modules, previously distributed in November 2013, directly to IT tutor computers; in addition, MoH IT staff provided a copy on a USB drive and in a shared Internet-based folder. The remaining modules were distributed via the shared Internet-based folder, and a USB drive was given to each school principal, who then distributed these modules to IT tutors in late April.

PHASE 4: FINAL EVALUATION

Phase Four consisted of a pilot study to assess the feasibility of supplemental eLearning content in midwifery education programs. This study was implemented by Jhpiego with support from members of the MoH IT team.

Feasibility Study

STUDY OBJECTIVES

The objectives of the study are described below:

1. Determine the feasibility (in terms of accessibility, usability, acceptability) of using eLearning in six midwifery schools in Ghana

2. Understand the experience of midwifery instructors, students, information technology (IT) staff, and principals/heads of school in implementing selected eLearning content as supplements to courses

3. Identify priority areas for strengthening implementation of eLearning in midwifery education programs in Ghana

4. Measure the timeliness of uptake at the school level (installation on computers, use of modules) of newly released eLearning modules after dissemination from the central level

METHODOLOGY

Study Design

As a pilot feasibility study, no attempt was made to achieve statistical power in the sample size. Qualitative as well as quantitative methods were used to understand the experience and feasibility of implementing an eLearning system from a variety of viewpoints. Data sources included user data from the Skoool™HE platform, self-administered surveys, and in-depth interviews.

Study Area/Site Selection

The six participant midwifery schools have been working with MCHIP since 2010 and represent five regions of Ghana. See Figure 2 [30] for a geographic distribution of selected midwifery schools.

Figure 2. Geographic Distribution of Selected Midwifery Schools
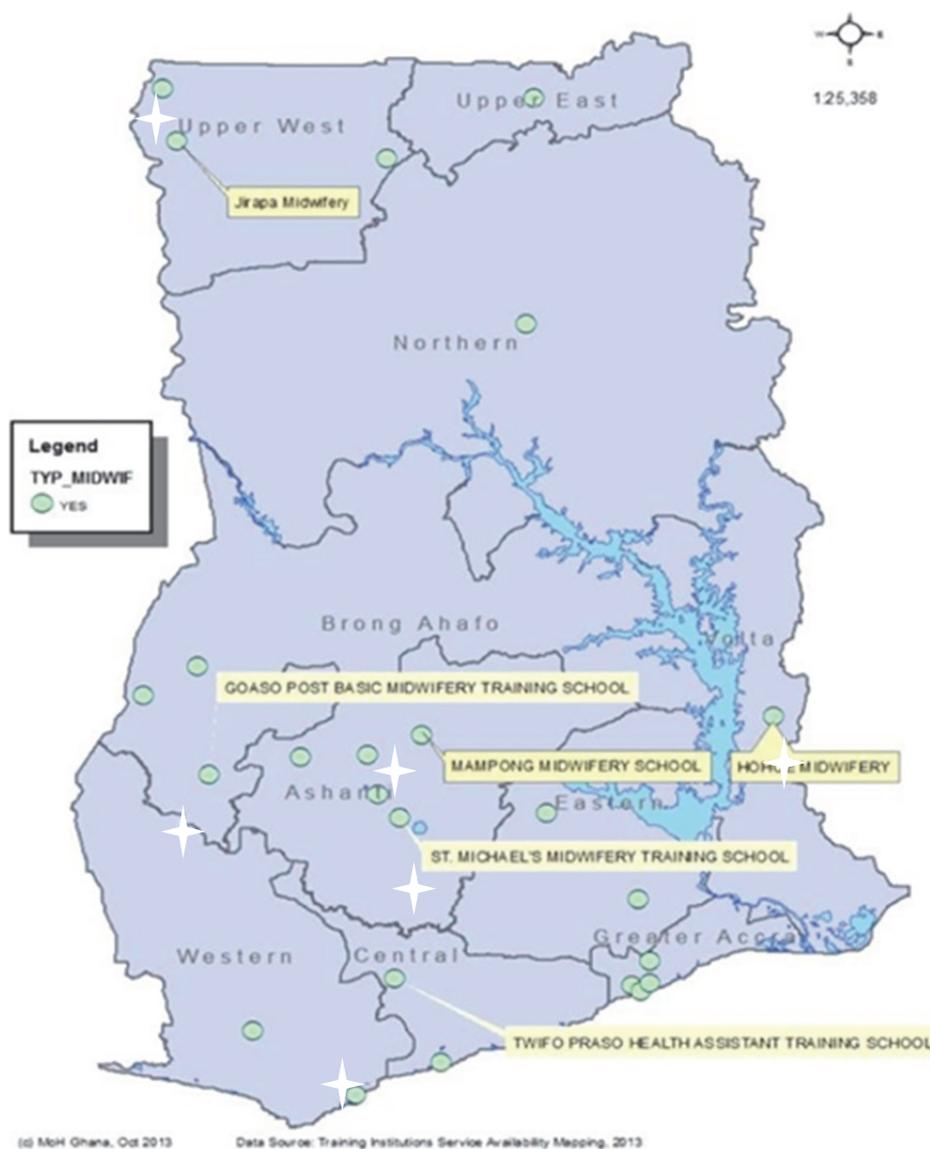
Study Population and Sample Size

The study population was drawn from those in the midwifery schools who interacted with the modules or aided in their implementation. Specifically, these groups included final year midwifery students, midwifery instructors, IT tutors, heads of schools, and the five MoH IT staff who supported implementation. Table 1 shows the student and instructor population by school [31].

Table 1. Final Year Students and Midwifery Instructors by School

SCHOOL	FINAL YEAR STUDENTS (N)	MIDWIFERY INSTRUCTORS (N)
Goaso	96	7
Jirapa	131	6
Twifo Praso	291	12
St. Michael	59	6
Mampong	735	21
Hohoe	150	13

The inclusion criteria for each group are described below:

1. Final year midwifery students who completed—or were in the process of completing—one or more of the eLearning courses during January 2014 through May 2014

2. Midwifery instructors who were faculty members, taught the content in the modules, and used—or were in the process of using—an eLearning course to supplement his or her teaching

3. IT tutors who taught introductory computer skills, maintained computer laboratories, supported other IT efforts in the school, and were responsible for school level implementation of the eLearning modules

4. Individuals who were appointed as heads of schools, principals, or their designees

5. MoH IT team—five individuals from the MoH who supported eLearning implementation

STUDY PROCEDURES

Protection of Human Subjects

This study received approval from the Ghana Health Services (GHS) Ethical Review Committee (ERC) and the Johns Hopkins Bloomberg School of Public Health (JHSPH) Institutional Review Board (IRB). The principal investigator and co-investigators received certification for human subjects research from the Collaborative Institutional Training Initiative (CITI).

All participants were consented prior to receiving surveys or being interviewed. Co-investigators conducted the in-depth interviews. All other data collectors were trained using the *JHSPH Human Subjects Research Ethics Field Training Guide*, adapted for use in Ghana.

All survey data were returned to the Jhpiego Ghana office in Accra in sealed envelopes or via password-protected electronic files. Hard and soft copies of the data are kept in locked files.

Data Collection

Between May 20 and May 29, 2014, two teams comprising eight data collectors and three study team members visited the six schools. At each school, convenience sampling was used to recruit students and midwifery instructors who were surveyed about their use of the eLearning modules. Written consent was obtained prior to administering the survey. Refer to Appendices 1 and 2 for survey tools used.

In-depth interviews were conducted with the IT tutors from each school on their experience in supporting eLearning. Principals were interviewed regarding how they supported eLearning implementation as well as costs to their school. Oral consent was obtained prior to all interviews. Refer to Appendices 3 and 4 for interview tools used.

On June 10 and 11, 2014, in-depth interviews were conducted with three of the MoH IT team members about their experience in implementing and supporting eLearning in the six schools. Oral consent was obtained prior to the interviews. Refer to Appendix 5 for the interview tool used.

DATA ANALYSIS

Qualitative data collected through the in-depth interviews were analyzed and coded for themes. Quantitative data collected through the student and midwifery instructor surveys were analyzed to identify how responses related to the areas of accessibility, usability, and acceptability.

Results

Results are presented by area of interest: feasibility (in terms of accessibility, usability, and acceptability).

RESPONDENTS

Final Year Midwifery Students

Of the 1,462 final year students enrolled at these six schools, 336 were surveyed. Eight of these respondents did not report having used an eLearning module; thus analysis is based on reports from the remaining 328 students who reported having used at least one eLearning module. The majority of student respondents were enrolled in the post-basic midwifery program (61%), with the remainder enrolled in the diploma program. Only one student respondent was male (<0.3%). Table 2 shows the number of student respondents by school.

Table 2. Student Respondents (N=328)

SCHOOL	NUMBER OF FINAL YEAR STUDENTS	NUMBER OF RESPONDENTS	PERCENTAGE SURVEYED
MTS Goaso	96	45	47%
MTS Jirapa	131	50	38%
MTS Twifo Praso	291	28	10%
MTS St. Michael	59	31	53%
MTS Mampong	735	125	17%
MTS Hohoe	150	49	33%
Sub-Totals	1,462	328	22%

Midwifery Instructors

Of the 65 midwifery instructors, 20 enrolled in the platform. Of the 13 surveyed instructors, 12 reported using at least one module. Table 3 shows the number of midwifery instructor respondents by school.

All twelve of the midwifery instructors surveyed were female, and seven were between the ages of 30 and 39.

Table 3. Midwifery Instructor Respondents (N=12)

SCHOOL	NUMBER OF MIDWIFERY INSTRUCTORS	NUMBER OF RESPONDENTS
MTS Goaso	7	3
MTS Jirapa	6	3
MTS Twifo Praso	12	3
MTS St. Michael	6	0
MTS Mampong	21	0
MTS Hohoe	13	3
Sub-Totals	65	12

IT Tutors

Each school has one IT tutor, and all six tutors were interviewed.

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Heads/Principals of Schools

Five of the six heads/principals of schools were interviewed. The head of MTS Goaso was not interviewed.

MoH IT Team

Of the five MoH IT team members, three were interviewed.

ACCESSIBILITY

Understanding access as it contributes to feasibility of eLearning includes access to a computer, computer skills, and the availability of resources to solve any problems that arise.

Midwifery Students

The survey included questions related to understanding students' general computer use. Almost three-quarters (73%) of participants owned a computer, but only a third (30%) had purchased their computers through the MoH program (Table 4). Ownership rates varied markedly among schools from 2%–35% [31]. Student computer usage frequency was reported as daily (45%) and used most often (88%) at school (Table 4). A little over half of the students (52%) reported that computers were available on campus to use for assignments. About one-third reported feeling only somewhat confident (38%) or not very confident (32%) with computer use (Table 4).

Table 4. Student-Computer Relationship

VARIABLE	MTS GOASO	MTS JIRAPA	MTS TWIFO PRASO	MTS ST. MICHAEL	MTS MAMPONG	MTS HOHOE	TOTAL N (%)
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Computer Ownership							
Yes (N=318)	42 (93)	18 (36)	25 (89)	27 (87)	78 (62)	48 (98)	238 (73)
Purchased with support from MoH (N=238)	10/42 (24)	1/18 (6)	18/25 (72)	18/27 (67)	8/78 (10)	17/48 (35)	72 (30%)
Usage Frequency (N=320)							
Daily	10 (22)	13 (26)	13 (46)	16 (52)	52 (42)	40 (82)	144 (45)
Weekly	26 (58)	19 (38)	13 (46)	10 (32)	45 (36)	9 (18)	122 (38)
Monthly	7 (16)	7 (14)	2 (7)	3 (10)	11 (9)	0 (0)	30 (9)
Less than once a month	2 (4)	7 (14)	0 (0)	2 (6)	13 (10)	0 (0)	24 (8)
Purpose of computer usage (N=328, multi-response)							
Personal (social media, gaming, email, etc.)	24 (53)	20 (40)	21 (75)	23 (74)	87 (70)	29 (59)	204 (62)
Class assignments	29 (64)	15 (30)	24 (86)	27 (87)	81 (65)	28 (57)	204 (62)
Other learning or research	39 (87)	31 (62)	28 (100)	19 (61)	89 (71)	44 (90)	250 (76)
Locations of computer use (N=324)							
Home	39 (87)	13 (26)	21 (75)	23 (74)	82 (66)	30 (61)	208 (64)
School	35 (78)	44 (88)	28 (100)	26 (84)	107 (86)	45 (92)	285 (88)
Internet cafe	5 (11)	5 (10)	6 (21)	4 (13)	19 (15)	2 (4)	41 (13)

VARIABLE	MTS GOASO	MTS JIRAPA	MTS TWIFO PRASO	MTS ST. MICHAEL	MTS MAMPONG	MTS HOHOE	TOTAL N (%)
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
School computer availability to complete assignments (N=319)	26 (58)	2 (4)	27 (96)	13 (42)	57 (46)	44 (90)	169 (52)
Confidence using computers (N=326)							
Very confident	7 (16)	9 (18)	16 (57)	4 (13)	31 (25)	26 (53)	93 (29)
Somewhat confident	19 (42)	12 (24)	8 (29)	14 (45)	52 (42)	18 (37)	123 (38)
Not very confident	18 (40)	28 (56)	2 (7)	13 (42)	38 (30)	5 (10)	104 (32)
Not at all confident	0 (0)	1 (2)	2 (7)	0 (0)	3 (2)	0 (0)	6 (2)

Midwifery Instructors

All instructors surveyed owned a computer and 11 of the 12 said they use it on a daily basis. Over half (7) of the instructors reported feeling very confident using a computer for teaching and for personal activities. Eight of the midwifery instructors said there was IT support for teachers who use computers to teach, and two reported that courses or workshops on computer use were available.

Half of the instructors surveyed agreed that computers were available in their school for faculty/staff use, while seven reported that computers were available for student use. It is noteworthy that student and faculty reports of computer availability for students did not always agree. At Jirapa, computer availability for students was reported by two of the three surveyed instructors; however, only 4% of students at Jirapa reported that computers were available to them. Alternatively, none of the three instructors from Twifo Praso agreed that computers were available for students to use, while 96% of Twifo Praso students reported that school computers were available to complete assignments.

IT Tutors

IT tutor interviews revealed that the structured rollout of eLearning implementation was successful. However, several common challenges emerged as well: increased workload, structured rollout at the school level, and weak infrastructure.

All IT tutors noted that introduction of the program to schools significantly increased their responsibilities. Prior to installing the platform on a student's computer, tutors found that viruses needed to be removed to prevent software corruption and to allow the Skoool™HE software to work well. Other tutors faced the challenge of introducing the platform to students and instructors who had limited computer knowledge. One tutor reported that he was required to focus on developing basic computer knowledge and skills in post-basic programs because there was no IT exposure prior to implementation of the program. To address the increased workload and assist with platform installation, IT tutors developed workarounds. These included utilizing other students and tutors to do installations/provide technical assistance and putting students in small groups to learn/help one another.

IT tutors reported that the structured rollout of the platform enabled them to reach direct users of the program. At the school level, IT tutors reported adequate support from the MoH IT team and the principals during implementation. The structured rollout appeared to be one of the primary successes of their experience, but it was hampered by poor infrastructure (e.g., inconsistent/weak Internet connectivity, lack of computers, unavailability of air conditioning in server rooms, space for computer laboratories, inconsistent electrical supply, and lack of anti-virus software. Systems within schools were inadequate for successful tracking of problems that arose with student computers and for documenting problems with the platform.

Principals/Heads of Schools

In-depth interviews with principals revealed themes such as overall supportive attitude with respect to eLearning, increased costs to schools, increased workload of IT tutors, and poor infrastructure.

The interviewed principals differed in the extent to which they were involved in eLearning implementation, but all showed support for the initiative. Most took on an advocacy role to procure resources to facilitate eLearning implementation, with variable success.

Increased costs to schools emerged as a constant theme from the interview process. Student school fees helped fund the extra costs of implementation. Extra costs included an electrical generator, a suitable Internet connection, the expansion of Internet access across the campus, and computers for laboratories. Success in procuring funds to alleviate some of the cost burden from third parties varied. Alternative sources of funding included the Ghana Investment Fund for Electronic Communications (GIFEC). The increased IT tutor workload generated by this initiative was noted, and attempts were made to alleviate the burden by hiring new staff.

Most principals interviewed reported inadequate infrastructure at their schools. A limited number of computers, slow or non-existent Internet connectivity, and lack of proper space were some of the challenges mentioned.

MOH IT Team

The following themes emerged from the MoH IT team interviews: out-of-pocket costs to IT tutors, general systems governance, and poor infrastructure.

During the interviews, participants noted that IT tutors used their personal phone credit to contact the MoH IT staff in order to resolve technology issues. Some of these issues were complex and required long calls, as well as follow-up calls, to address the problems.

From the MoH IT point of view, poor infrastructure included insufficient resources, staffing, and systems. As mentioned by IT tutors and principals at schools, better Internet connectivity and more computers were still needed. Inadequate staffing was an unforeseen contributor to poor infrastructure. This problem was often exacerbated by the need to repair or update students' computers, at times more than once, prior to program installation. This became time-consuming for the IT tutors and hindered dissemination. Some respondents voiced the need for an eLearning focal person at the MoH level. Members of the team that was responsible during the pilot study were pulled from different departments within the MoH, and still had ongoing responsibilities outside eLearning. The program's system for addressing problems after MCHIP communicated them to Intel was unclear and inadequate; overall, this resulted in a reactive, instead of an anticipatory, approach to issues faced by the schools. The many unanticipated challenges with the platform resulted in *ad hoc* solutions that were not always successful.

Many of the challenges identified by the MoH IT team are related to the need for overarching system governance, which the implementers were unable to provide in a resource-constrained pilot setting. The Skoool™HE system itself provides a useful capability that requires minimal financial resources: no-cost software that works with occasional and minimal connectivity, that can support locally created content, and that can support any language. Yet system governance and capacity at the local level (or lack thereof) can still limit success. Without governance, the system can quickly break down because no one is responsible to enforce proper standard operation or implementation (e.g., setting up a local content hub), to enable system changes (e.g., ensuring delivery of new content), or to make necessary improvements (e.g., distributing software updates).

USABILITY

Usability, for the purposes of this study, was defined as correctly functioning software and the ability to complete the modules as they were intended and designed.

Midwifery Students

The majority of students surveyed reported that the IT tutor taught them how to use the Skoool™HE platform (81%) and oriented them to the eLearning modules (80%).

Almost half (45%) of students reported having no problems with the platform. Of those who did report problems, 83% reported challenges with logging onto the platform/password. No other significant challenges were reported. Of the students who sought help, 72% did so from the IT tutor. Three-quarters of students who sought help, reported that their problems were solved.

Figure 3 below shows the overall percentage of midwifery student respondents who reported using the six modules.

Figure 3. Overall use of Modules in Six Schools

Overall use of Modules in Six Schools

- Postpartum Hemmorhage
- Pre-Eclampsia/Eclampsia
- Pevention of Obstructed Labor
- Postabortion Care
- HIV and Stigma
- Malaria in Pregnancy
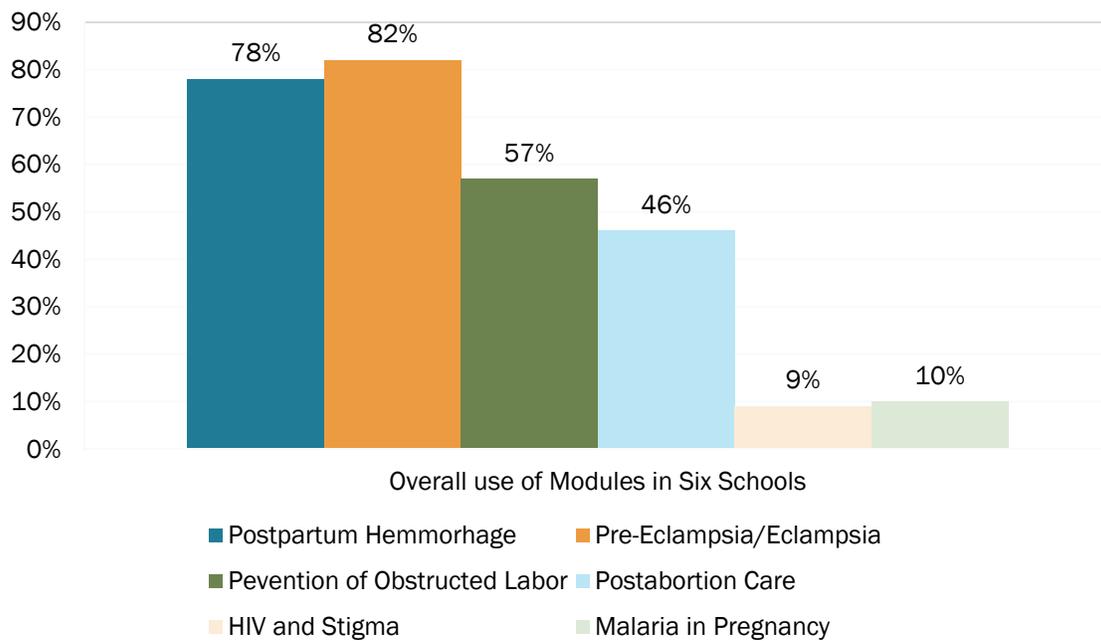
A breakdown of module use by school can be found in Table 5 below.

Table 5. Student Module Usage by School

MODULE TITLE	MTS GOASO (N=45)	MTS JIRAPA (N=50)	MTS TWIFO PRASO (N=28)	MTS ST. MICHAEL (N=31)	MTS MAMPONG (N=125)	MTS HOHOE (N=49)
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Postpartum Hemorrhage	43 (96)	33 (66)	23 (82)	24 (77)	87 (70)	46 (94)
Pre-eclampsia/Eclampsia	32 (71)	35 (70)	23 (82)	16 (52)	117 (94)	46 (94)
Prevention of Obstructed Labor	21 (47)	31 (62)	20 (71)	8 (26)	71 (57)	35 (71)
Postabortion Care	18 (40)	16 (32)	26 (93)	11 (35)	49 (39)	31 (63)
HIV and Stigma	0 (0)	0 (0)	9 (32)	0 (0)	19 (15)	0 (0)
Malaria in Pregnancy	0 (0)	0 (0)	10 (36)	0 (0)	24 (19)	0 (0)

For those who accessed the modules, 73% used a personal computer, 31% used a friend's computer, and 10% used the school computer lab. Table 6 provides a breakdown by school. These numbers varied because reported computer ownership rates varied greatly by school as illustrated in Table 4.

Table 6. Points of Access of Student Module Use

POINTS OF ACCESS (MULTI-SELECT)	MTS GOASO (N=45)	MTS JIRAPA (N=50)	MTS TWIFO PRASO (N=28)	MTS ST. MICHAEL (N=31)	MTS MAMPONG (N=125)	MTS HOHOE (N=49)
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Personal computer	40 (89)	18 (36)	28 (100)	29 (94)	75 (60)	48 (98)
School computer lab	3 (7)	6 (12)	7 (25)	0 (0)	15 (12)	3 (6)
Friend's computer	11(24)	23 (46)	7 (25)	3 (10)	47 (38)	10 (20)
Classroom group (on projector)	5 (11)	13 (26)	1 (4)	1 (3)	43 (34)	5 (10)

Midwifery Instructors

Ten of the 12 midwifery instructors reported learning how to use the Skoool™HE platform and eLearning modules from the IT tutor. Eleven instructors reported that learning to use the Skoool™HE platform and the accompanying modules was very or somewhat easy.

The top three technical problems, as reported by midwifery instructors, was using the modules in the classroom, following student activity, and logging in. Similar to student experience, seven of the midwifery instructors reported seeking assistance from the IT tutor.

All modules, excluding the HIV and Stigma and Malaria in Pregnancy modules, were used by instructors. Use of modules is reported in Table 7. Investigators attribute non-reporting by tutors on their use of the HIV and malaria modules to the fact that these modules were only available for a short time prior to the survey. In addition, the HIV and malaria module content was not taught in the classroom during April and May, when the modules were made available to the schools.

Table 7. Reported Midwifery Instructor Module Use

MODULE TITLE	NUMBER OF MIDWIFERY INSTRUCTORS (N=12)
Postpartum Hemorrhage	10
Pre-eclampsia/Eclampsia	8
Prevention of Obstructed Labor	6
Postabortion Care	5
HIV and Stigma	0
Malaria in Pregnancy	0

Midwifery instructors were asked how they used the modules in teaching the course material. Nine reported using them as an individual assignment, two as a group assignment, and five as part of in-class content. All instructors surveyed reported that the eLearning modules were very useful in teaching the course material.

IT Tutors and MOH IT Team

Themes that emerged from the IT tutor and from the MoH interviews regarding usability of the Skoool™HE platform included unexpected challenges and issues with technology at the school, which ultimately impacted platform performance. Students became frustrated because of the extended period of time needed to open and load the software. IT tutors had hoped to view student performance on the two locally developed modules, but due to some initial server issues, this was not possible for all students. IT tutors reported that, because of these challenges, a few students considered Skoool™HE to be an additional responsibility instead of a platform that complemented their studies. Functionally, we are now able to view student performance on the modules, but this functionality was only implemented after many of the students had already completed the modules; so their results did not synchronize with the correct cloud-based database.

ACCEPTABILITY

For the feasibility study, acceptability was defined as the sentiment among users of the platform's suitability as a medium to deliver the content and meet their personal needs.

Midwifery Students and Midwifery Instructors

Overall, the eLearning initiative within the six pilot schools was well-accepted among the student population. Students reported that eLearning helped them understand content (51%) and that, because of eLearning, they knew more about a topic (46%).

Among midwifery instructors, all reported that they would be likely to use other modules, if available. However, four of those surveyed shared challenges incorporating the modules into their course (e.g., the increased time needed to revise the course syllabus). Three reported inadequate access to computers.

IT Tutors

From the in-depth interviews with tutors, investigators found that the program increased job satisfaction and helped tutors feel as though they were a part of midwifery education. Almost half of those interviewed shared their pleasure in how the program would assist students in gaining more IT skills.

Principals/Heads of Schools

Of the principals surveyed, enthusiasm for the program was evident, indicating high acceptability. Principals mentioned several benefits of the program for students and instructors as well as

residual impacts. Improvement of student computer skills and new ways of material delivery were both mentioned; principals observed an increase in student buy-in for personal computers. Modules also provided valuable refreshers for midwifery instructors teaching the content.

Discussion

PROJECT STRENGTHS

Based on the qualitative and quantitative data gathered, several successes were observed during implementation of the eLearning program.

Structured introduction and subsequent rollout of the eLearning modules to the schools was a strong point of the project. Initial introduction and training with the IT tutors made them the on-site experts for implementation and assistance in their schools. This empowered and legitimized their role and linked them to midwifery education and to students and teachers.

Another success was the overall excitement of principals/heads of schools and IT tutors to be using the program, as well as the perceived utility of the program by midwifery instructors. Numerous requests for additional modules by midwifery instructors and principals/heads of schools on different content indicate a keen interest in the program, although further investigation into modules' impact on student learning outcomes should be conducted. In addition, the multiple solutions developed by school IT tutors to implement or troubleshoot the program showed commitment to the initiative.

In terms of sustainability from a financial resources perspective, the pilot rollout was promising. Leveraging existing human resources, the eLearning platform was rolled out to a large number of students at minimal cost with minimal ongoing project costs projected.

CHALLENGES FACED

As a pilot rollout, the project worked within established systems, without setting up new parameters for governance and capacity-building. The primary challenges faced during implementation of the eLearning program were due to inadequacies of what already existed.

Resources (computers, anti-virus software, electricity, Internet, and staff) were identified by schools as significant challenges. Skoool™HE was originally selected for its ability to function both online and offline because Internet connectivity was limited within the schools. However, the Internet capacity needed to communicate with the MoH IT team and fellow IT tutors about solutions to technical issues exceeded the capacity available in the schools. Based on the interviews, there appeared to be confusion regarding the need to use the Internet to install and use the platform modules. Many reported that the largest implementation challenge was the lack of Internet capacity; more information about what Internet functionality was needed to implement the platform was not collected. Systems governance inadequacies included a lack of institutionalized systems for tracking and addressing technical problems with the platform and computers and for tabulating which students had access to the modules.

Although the Skoool™HE platform was developed for use in computer laboratories, the schools were not set up with computers that could support multiple-user accounts. This prohibited more than one student being able to access the platform on a computer in the laboratory.

The version of packaging software needed for formatting the locally developed modules proved to be incompatible with the Skoool™HE platform. This incompatibility made it impossible to track students' quiz responses and module completion rates.

LIMITATIONS OF STUDY

There were several limitations of this study. The implementation was a pilot study; so the eLearning modules were rolled out to six schools, which limits generalizability. The sample of

users surveyed was a small convenience sample in each school and responses may not reflect the total population of users.

Although the recommendations made in the Information Communication Technology (ICT) readiness assessment were relayed to schools, follow-up on their fulfillment was not determined. During the survey, only general information regarding challenges faced was requested of IT tutors and principals.

The final limitation of the study was the short time that students and midwifery instructors had to work with the modules and the limited time that MoH and IT staff had to develop better systems to manage the eLearning system. There were three months of module use between dissemination and assessment. The window of opportunity for using the locally developed modules was even shorter (i.e., one month) due to challenges with the Skoool™HE platform. The content on malaria in pregnancy and stigma reduction for people living with HIV was not taught during this period.

Although the majority of students surveyed reported owning laptops, the ICT readiness assessment completed during Phase One, reported computer ownership among all students in the six schools to be 11% [31]. This discrepancy may be due to differences between the total student body and the students surveyed, reporting variability, or survey methods. Although this finding suggests that computer laboratories are still the primary places for student access, only 10% reported using the computer labs for accessing the eLearning modules.

MEETING STUDY OBJECTIVES

As mentioned previously, the study included the following objectives:

1. Determine the feasibility (in terms of accessibility, usability, acceptability) of using eLearning in six midwifery schools in Ghana
2. Understand the experience of midwifery instructors, students, IT staff, and principals/heads of school in implementing selected eLearning content as supplements to courses
3. Identify priority areas for strengthening implementation of eLearning in midwifery education programs in Ghana
4. Measure the timeliness of uptake at the school level (installation on computers, use of modules) of newly released eLearning modules after dissemination from the central level

The study accomplished the first three objectives. As noted above, the last two modules were available for a very short time and it was not possible to document uptake.

An eLearning system in Ghana is feasible, but only with certain support measures in place. Surveys showed that the program was widely accepted, but that platform usability and access to resources were very limited. System governance of the Skoool™HE platform—from server, to user account management, to module dissemination, to training—should be developed more robustly to pave the way for any scale-up efforts.

Between qualitative data and quantitative data collected, investigators were able to understand the intricacies, challenges, and experiences of implementation and to identify areas for improvement. In turn, this accomplished objectives two and three.

Objective four was partially accomplished. Of the total final year student population in the six schools (1,462) 734 enrolled in the platform, indicating that half of the target population had access to the first UNFPA modules distributed in November 2013. Investigators deemed that enrolling students into the platform was a success. Platform installation rates to computers at each school were not tracked, and due to challenges with the Ghana eLearning server, module usage data were not available.

Recommendations

In Ghana, eLearning is feasible, but only if specific changes are implemented. The following recommendations address challenges observed during data collection and, in turn, support national scale-up of an eLearning system. These recommendations have been grouped by needs at each level of implementation.

1. *Greater Support at Schools for Resources and Staff*
   The demands on existing resources and staff are considerable. Effective implementation of eLearning beyond this small pilot project will require significant investment in school resources, systems, and staffing.

   Our findings indicate the need for greater support to schools so they may obtain recommended Internet connectivity, acquire generators to serve as backup when electricity is limited, and purchase and install anti-virus software and computers for labs.

   Results from our survey show that the workload placed on the IT tutors and MoH staff was immense. Participant interviews revealed that often IT tutors needed to make significant repairs to students' computers before installation of the platform could take place. Often these repairs were needed because viruses had infected the computers. In addition, there was usually just one IT tutor to serve the entire school; the burden of adding eLearning tasks to tutors' already heavy workload was evident during the interviews. We suggest creating National Service Volunteer positions and/or using fellow students to support IT tutor implementation tasks. The workload for the MoH IT team indicates the need to designate at least one full-time employee to manage eLearning priorities within the MoH. The MoH IT team members all had ongoing responsibilities apart from eLearning support.

2. *Enhance Training on the Skoool™HE Platform and Systems Governance*
   To ensure that we take advantage of the platform's capabilities, it is important to expand upon the training of server administration, student enrollment to the platform, and general implementation management.

   A manual of Standard Operating Procedures (SOPs) for introduction and management of the platform at the central and school levels should be developed and distributed. The SOPs should include guidance on server administration, activities and responsibilities of platform introduction, technical issues that may arise, how to report issues, and a clear designation of how to track and report problems that arise.

3. *Content Approval and Development Guidelines Needed*
   Investigators strongly recommend that students and instructors understand the components of quality eLearning materials and how to distinguish between those that do and those that do not meet the standards taught in Ghana midwifery education. We recommend that national guidelines be developed for how to select eLearning materials that support the standards taught in Ghana.

   While developing the HIV and malaria modules, there was a need for specific processes to assure quality content and to streamline module production. We recommend establishing and disseminating guidelines for development of eLearning materials. We also recommend that a detailed protocol for eLearning module packaging, tracking, and dissemination, under the MoH IT team, be created and distributed.

4. *Assess Impact*
   Even though more than half of the targeted students enrolled, further investigation into module completion rates, quiz completion rates, impact, and learning outcomes—which was not possible with the Skoool™HE platform—is essential. In addition, because these modules were developed in part to aid in student licensure examination pass rates, further research into how these modules may support this goal should be explored. Long-term investigation into the quality of provider services and its effect on population health is crucial.

Like many technology tools in use in health education and health care provider support, eLearning as a complementary tool to midwifery education has the potential increase student knowledge and ultimately to improve licensure examination pass rates. The investigators of this study feel that these recommendations would aid in the sustainable national scale-up of eLearning and institutionalization of eLearning systems to improve midwifery performance.

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Appendices

APPENDIX 1: TOOL 1A—STUDENT SURVEY ON ELEARNING
Instructions

- Read the questions. If you have questions, please ask!

- Please answer each question as honestly as possible.

- Check the answer(s) that best match your experience.

Confidentiality Statement

Your answers are confidential and will not be shared with anybody. This includes your tutors, mentors, other students, spouses, family members, or anyone else related to the school. Only the data collectors, who are not associated with the school, will have access to this information.

If you do not want to answer a question, you may skip it. If you do not want to continue, you can stop at any time.

Questions about You

1. What type of program are you enrolled in? *(check one)*

   ☐ Midwifery diploma

   ☐ Midwifery post-graduate

2. Gender (check one)

   ☐ Female

   ☐ Male

3. What is your level in school at this time? (check one)

   ☐ 1st year

   ☐ 2nd year

   ☐ 3rd year

4. Which school do you attend? (check one)

   ☐ MTS Goaso

   ☐ MTS Hohoe

   ☐ MTS Jirapa

   ☐ MTS Mampong

   ☐ MTS St Michaels/Pramso

   ☐ MTS Twifo Praso

Questions about Your General Computer Use

1. **How often** do you use a computer? *(check one)*

   ☐ Daily

   ☐ Weekly

   ☐ Monthly

   ☐ Less than once a month

2. **For what** do you use a computer? (check all that apply)

   ☐ Personal (social media, games, email, etc.)

   ☐ Class assignments

   ☐ Other learning or research

   ☐ Other, please specify: _____

3. **Where** do you use a computer? (check all that apply)

   ☐ Home

   ☐ School

   ☐ Internet cafe

   ☐ Other, please specify: _____

4. Are computers available for students to use for class assignments? (check one)

   ☐ No

   ☐ Yes

5. How confident are you with computer use? (check one)

   ☐ Very confident

   ☐ Somewhat confident

   ☐ Not very confident

   ☐ Not at all confident

6. If you have a problem using computers, where do you go for help? Select the main source of help. (check one)

   ☐ IT at school

   ☐ Tutor

   ☐ Friend

   ☐ Other, please specify: _____

7. Do you own a computer? (check one)

   ☐ No

   ☐ Yes. Did you get help buying it from the Ministry of Health computer purchase program?
   ☐ No ☐ Yes

Questions about Your Experience with Skoool HE eLearning Modules

1. Who taught you how to use skoool HE? *(check one)*

    ☐ IT tutor

    ☐ Course Tutor

    ☐ Friend

    ☐ Other, please specify: _____

2. What problems did you have using skoool HE? (check one)

    ☐ No problems

    ☐ Difficulty with logging on, password

    ☐ Other problems, please specify: _____

3. If you had problems using skoool HE, who helped you? (check one)

    ☐ IT tutor

    ☐ Course Tutor

    ☐ Friend

    ☐ Other, please specify: _____

4. Were your problems using skoool HE resolved? (check one)

    ☐ No

    ☐ Yes

5. Which eLearning modules have you used? (check all that apply)

    ☐ Postpartum hemorrhage

    ☐ Pre-eclampsia/Eclampsia

    ☐ Prevention of obstructed labor

    ☐ Postabortion care

6. Where did you use the eLearning modules? (check all that apply)

    ☐ Personal computer

    ☐ School computer lab

    ☐ Friend's computer

    ☐ Classroom group (on projector)

    ☐ Other, please specify: _____

7. Who oriented you to the modules? (check one)

    ☐ IT tutor

    ☐ Course tutor

    ☐ Friend

    ☐ Other, please specify: _____

8. What types of problems have you had when using the eLearning modules? (check all that apply)

    ☐ Logging in

    ☐ Completing the modules

    ☐ Taking the quizzes

    ☐ Other problems, please specify: _____

9. When thinking about your experience using the eLearning modules, check the statements with which you agree.

    ☐ eLearning helped me understand the content for the topic.

    ☐ Because of eLearning I know more about the topic than I would have without the modules.

    ☐ I liked being able to review the content on my own using the eLearning modules.

    ☐ I would like to use additional eLearning modules.

This is the end of the survey. Thank you very much.

APPENDIX 2: TOOL 1B—TUTOR SURVEY ON ELEARNING
Instructions

Read the questions. If you have questions, please ask.

- Please answer each question as honestly as possible.

- Check the answer(s) that best match your experience.

Confidentiality Statement

Your answers are confidential and will not be shared with anybody. This includes your mentors, peers, students, supervisors, spouses, family members, or anyone else related to the school or your work. Only the data collectors, who are not associated with the school, will have access to this information.

If you do not want to answer a question, you may skip it. If you do not want to continue, you can stop at any time.

Questions about You

1. Gender (check one)
   - ☐ Female
   - ☐ Male

2. What is your position?
   - ☐ Tutor
   - ☐ Instructor
   - ☐ Preceptor
   - ☐ Other, please specify: _____

3. In which school do you work?
   - ☐ MTS Goaso
   - ☐ MTS Hohoe
   - ☐ MTS Jirapa
   - ☐ MTS Mampong
   - ☐ MTS St Michaels/Pramso
   - ☐ MTS Twifo Praso

4. What is your age?
   - ☐ Under 30 years
   - ☐ 30-39 years
   - ☐ 40-49 years
   - ☐ 50 years or older

Questions about Your General Computer Use

1. Do you own a computer? (check one)

   ☐ No

   ☐ Yes

2. How often do you use a computer? (check one)

   ☐ Daily

   ☐ Weekly

   ☐ Monthly

   ☐ Less than once a month

3. For what do you use a computer? (check all that apply)

   ☐ Personal (social media, games, email, etc.)

   ☐ To keep up with professional topics

   ☐ In teaching (PowerPoint, reviewing evidence, etc)

   ☐ For class assignments (handouts, assessments, etc)

   ☐ Other, please specify: _____

4. Where do you use a computer? (check all that apply)

   ☐ Home

   ☐ School / Work

   ☐ Internet café

   ☐ Other, please specify: _____

5. How confident are you with computers for personal use? (check one)

   ☐ Very confident

   ☐ Somewhat confident

   ☐ Not very confident

   ☐ Not at all confident

6. How confident are you using computers for teaching? (check one)

   ☐ Very confident

   ☐ Somewhat confident

   ☐ Not very confident

   ☐ Not at all confident

7. When thinking about your school, which statements are true? (check all that apply)

   ☐ There are computers for faculty and staff to use.

   ☐ There are computers for students to use for class assignments.

   ☐ There is IT support for tutors who use computers for teaching.

   ☐ There are courses or short workshops to update tutors on computer use.

Questions about Experience with Skoool HE Platform and the eLearning Modules

1. From whom did you primarily learn how to use the skoool HE platform and the eLearning modules? (check one)

    ☐ IT tutor

    ☐ A non-IT tutor

    ☐ Other, please specify: _____

2. How easy was it to learn to use the skoool HE platform and eLearning modules?

    ☐ Very easy

    ☐ Somewhat easy

    ☐ Somewhat difficult

    ☐ Very difficult

3. What types of problems have you had when using skoool HE and the eLearning modules? (check all that apply)

    ☐ Logging in

    ☐ Following student activity

    ☐ Using the modules in the classroom

    ☐ Other problems, please specify: _____

4. How did you resolve these problems?

    ☐ IT tutor helped me

    ☐ Colleague helped me

    ☐ Figured it out on my own

    ☐ Other, please specify: _____

5. Which eLearning modules have you used? (check all that apply)

    ☐ Postpartum hemorrhage

    ☐ Pre-eclampsia/Eclampsia

    ☐ Prevention of obstructed labor

    ☐ Postabortion care

6. How did you use the modules? (check all that apply)

    ☐ As individual assignment

    ☐ As group assignment

    ☐ As part of in-class content

    ☐ Other, please specify: _____

    ☐ I did not use the modules.

7. How useful were the eLearning modules in teaching the course material?
   ☐ Very useful
   ☐ Somewhat useful
   ☐ Somewhat useful
   ☐ Not at all useful

8. Have you used skoool HE to follow how students are doing on the modules? (check one)
   ☐ No
   ☐ Yes

9. What challenges did you face trying to incorporating the eLearning modules into your course? (check all that apply)
   ☐ Time needed to redesign course syllabus
   ☐ Inadequate access to computers
   ☐ Electricity outages
   ☐ Other, please specify: _____
   ☐ I did not experience any challenges.

10. How likely would you be to use other eLearning modules if they were available?
    ☐ Very likely
    ☐ Somewhat likely
    ☐ Somewhat unlikely
    ☐ Very unlikely
    ☐ I would not use other eLearning modules.

This is the end of the survey. Thank you very much.

APPENDIX 3: TOOL 2—IT TUTOR INTERVIEW GUIDE

Study Title: Feasibility of Utilizing eLearning Content in Midwifery Schools in Ghana (IRB 00005556)

Principal Investigator: Catherine Carr, Jhpiego Senior Technical Advisor, Global Learning

DATE				2014	INTERVIEWER		
	Day	Mo	Year		SCHOOL	☐ MTS Goaso ☐ MTS Hohoe ☐ MTS Jirapa	☐ MTS Mampong ☐ MTS St Michaels ☐ MTS Twifo Praso
START TIME		☐ a.m. ☐ p.m.			END TIME	☐ a.m. ☐ p.m.	
REVIEWED BY					DATA ENTERED BY:		
SIGNATURE					SIGNATURE		

Thank you again for agreeing to this interview. I will be asking you to answer questions in your own words. Take your time, and ask me to clarify if you have any question about what is wanted. Please keep in mind that you may choose to not answer any question and you can stop at any time. All information you provide will be anonymous. In reporting we will combine data and will not identify specific schools.

1. Please tell me how your role as an IT tutor has changed since introducing the skoool HE platform and eLearning modules at your school. *Probes: Have your responsibilities increased? Has your satisfaction with your work increased due to supporting introduction of this new technology?*

2. Tell me how you prepared for introducing the skoool HE platform at your school.

   A. What about infrastructure? Tell me about those preparations. (*Probes: Do you feel that the infrastructure in place at your school such as computers, internet, etc. was sufficient for successful implementation of eLearning? Did you need to advocate for computers, software, other materials? If so, what specific infrastructure were you missing?*

   B. Tell me how you prepared the school administration. *Probe: principal, head of school*

C. What about the tutors? Tell me how you prepared the tutors who are using skoool HE platform and modules.

3. Supporting a new initiative can bring new challenges. Tell me what challenges you faced in supporting the skoool HE platform and the eLearning modules. *Probes: What type of challenges were they: platform use, uploading content onto computers, other?*

4. When you experienced challenges with supporting the skoool HE platform, tell me about the support you received to overcome those challenges. *Probes: Who were you able to contact for advice, for help? How often did you need help? Did you receive what you needed in a timely way?*

5. Some heads of schools are very involved in the details of implementing new IT platforms, others are more "big picture" leaders. What about your head of school? Please describe the support you received from your school for this work related to the skoool HE platform.

6. When implementing the skoool HE platform, you must have had many requests for help. Tell me about the requests you received <u>most often</u>. *Probes: Who asked for support? What type of help did they need? Probe for specific requests, such as "teacher could not login", etc.*

7. Some people are very quick at learning to use new technology, others are not. Tell me your opinion about the students' use of the eLearning modules. *Probes: level of engagement; ease of use; usefulness; speed at which they learned to use the modules*

8. What about the tutors? Tell me your opinion about the tutors' use of the eLearning modules. *Probes: level of engagement; ease of use; usefulness; speed at which they learned to use the modules*

9. Please tell me any other comments or thoughts you would like to share about the skoool HE platform and the eLearning modules.

That is all the questions I have for you. Thank you again for taking the time to speak with me today.

APPENDIX 4: TOOL 3—PRINCIPAL/HEAD OF SCHOOL INTERVIEW GUIDE

Study Title: Feasibility of Utilizing eLearning Content in Midwifery Schools in Ghana (IRB 00005556)

Principal Investigator: Catherine Carr, Jhpiego Senior Technical Advisor, Global Learning

DATE				2014	INTERVIEWER		
	Day	Mo	Year		SCHOOL	☐ MTS Goaso ☐ MTS Hohoe ☐ MTS Jirapa	☐ MTS Mampong ☐ MTS St Michaels ☐ MTS Twifo Praso
START TIME				☐ a.m. ☐ p.m.	END TIME		☐ a.m. ☐ p.m.
REVIEWED BY					DATA ENTERED BY:		
SIGNATURE					SIGNATURE		

Thank you again for agreeing to this interview. I will be asking you to answer questions in your own words. Take your time, and ask me to clarify if you have any question about what is wanted. Please keep in mind that you may choose to not answer any question and that you can stop at any time. All information you provide will be anonymous. We will report information in combined form that does not identify specific schools.

1. Let's begin by talking about your overall experience with implementing the skoool HE platform and eLearning modules at this school. Please tell me about your experience with this process. *Probe: Was it a smooth implementation?*

2. A lot of preparation goes into launching a new initiative, such as using the skoool HE platform for eLearning modules. Please tell me how you were you oriented and updated to the implementation plan for eLearning at your school? *Probes: Who first discussed it with you? How were you updated as the implementation went on? Did you feel you had enough information and support to implement this at your school?*

3. What about the preparations in terms of infrastructure? Tell me about that. *Probes: Do you feel that the infrastructure in place at your school such as computers, internet, etc. was sufficient for successful implementation of eLearning? Did you need to advocate for computers, software, other materials? If so, what specific infrastructure were you missing and how did you work around that constraint?*

4. What about tutors and staff? Describe the concerns they had about incorporating eLearning modules. *Probes: need to adjust course syllabus / assignments? ease of use; usefulness; speed at which they learned to use the modules*

5. Some people are very comfortable with new technology, and others need more time to feel comfortable. Tell me how <u>you</u> felt about launching and supporting the introduction of eLearning technology at this school. *Probes: What was your level of engagement - big picture, such as advocacy, or more detailed such as working directly with IT staff? Did you feel that you had the support you needed to do this? E.g., support from MOH IT team. Who were you able to contact for advice, for help? How often did you need help? Did you receive what you needed in a timely way?*

6. Please describe what needed to change at this school to effectively implement eLearning. *Probes: Resource allocation for teaching staff? For administrative staff? For computers and other infrastructure? Did you need to change responsibilities or job descriptions? Were new people hired? How did it affect the workload in general? Were you able to advocate for additional resources?*

7. Starting new initiatives can be very challenging, but we hope that they will also bring some new success to our institutions. Let's start with what made this work more difficult. What would you say the biggest challenges were to implementing eLearning at this school? *Probes: Were there unexpected costs or resource needs? Was the technical infrastructure sufficient? Lack of tutor buy-in? Student use? Time? Costs? Convenience?*

8. Now, tell me about the successes your school had in implementing use of eLearning modules. *PROBES: Access to learning materials for students, helped faculty with teaching, innovation for school.*

9. If another school were deciding whether or not to use eLearning modules, tell me what advice you would give that principal/head of school. *Probes: What should they do to make it successful? What have you learned that you would want to share?*

10. Please tell me any other comments or thoughts you would like to share about implementing the skoool HE platform and the eLearning modules in your school.

That is all the questions I have for you. Thank you again for taking the time to speak with me today.

APPENDIX 5: TOOL 4—MOH IT TEAM INTERVIEW GUIDE

Study Title: Feasibility of Utilizing eLearning Content in Midwifery Schools in Ghana (IRB 00005556)

Principal Investigator: Catherine Carr, Jhpiego Senior Technical Advisor, Global Learning

DATE					2014	INTERVIEWER	
START TIME				☐ a.m. ☐ p.m.		END TIME	☐ a.m. ☐ p.m.
REVIEWED BY					DATA ENTERED BY:		
SIGNATURE					SIGNATURE		

Thank you again for agreeing to this interview. I will be asking you to answer questions in your own words about the pilot project introducing eLearning modules into midwifery schools. Take your time, and ask me to clarify if you have any question about what is wanted. Please keep in mind that you may choose to not answer any question and that you can stop at any time. All information you provide will be anonymous.

1. Let's begin by talking about disseminating the skoool HE platform and the eLearning modules to the pilot midwifery schools. Please tell me about this process. *Probes: Did you personally have to visit schools to set up the skoool HE platform? How often did you have to upload a module to the platform? How did you support the IT tutors to distribute the modules at their respective schools?*

2. Thinking about the schools' IT staff, tell me about the requests for support you received. *Probes: How many on average received from a school? Did different schools have the same requests? What are some examples of the types of requests you received? Did the types of requests change over time?*

3. Coordination between the MoH IT team based in Accra, and six schools across the country along with their IT tutors must have been challenging. Tell me about the biggest challenges of this process. *Probes: Communications (phone service / internet connectivity issues)?*

4. Tell me about your experience managing data from the skoool website. *Probes: How about viewing, aggregating and exporting data? Was it easy or difficult? In what ways?*

5. Tell me how you used the data collected from the skoool website. *Probes: Did you collect it at the request of heads of schools? Or did you routinely report it to them? Did you feel that this data was useful from an administrative standpoint to the school? Why or why not? Did the heads of schools want this data? Did they use it? Do you know if they shared it with tutors?*

6. This is the first time large scale eLearning for pre-service education has been tried in Ghana. This must have brought successes, and also challenges. Let's start with the challenges. Please tell me what the biggest challenges were to introducing eLearning into these six midwifery schools.

7. Now, how about the most notable successes? Please tell me about those.

8. If eLearning were to be introduced to more schools, tell me what the next steps would be. *Probes: What changes would need to be made to the infrastructure at ministry level, at school level? Human resource needs? Policy changes?*

That is all the questions I have for you. Thank you again for taking the time to speak with me today.