Journal of Health Informatics in Africa

9th Health Informatics in Africa Conference (HELINA 2014)
Peer-reviewed and selected under the responsibility of the Scientific Programme Committee

The Ethiopian national eHealth strategy and its alignment with the health informatics curriculum

Binyam Tilahun[a,b],* Atinkut Zeleke[a], Mengistu Kifle[c], Fleur Fritz[b]

[a] Department of Health Informatics, University of Gondar, Ethiopia
[b] Institute of Medical Informatics, University of Münster, Germany
[c] Public Health Infrastructure Directorate, Ministry of Health, Addis Ababa, Ethiopia

Background: Many countries have developed eHealth strategies based on the WHO and ITU eHealth strategy toolkit. However, the success of the strategy, which appears to influence the diffusion of eHealth systems, is mainly dependent on the availability of skilled health informaticians at all levels. The purpose of this paper is therefore to review the Ethiopian eHealth strategy draft with respect to expertise requirements and to compare it with the graduate profile of the only bachelor in health informatics program in Ethiopia.
Methods: A comparative analysis of the eHealth strategy with the curriculum of the bachelor in health informatics program was done. In the analysis, we identify the main focus areas of the eHealth strategy and compare its coverage in the academic and practical competency areas of the curriculum.
Results: The eHealth strategy identifies five main areas of priorities for health information system implementations. They are: Health information systems, Telemedicine, mHealth, eLearning (for health workforce training) and community information systems. The curriculum contains 62 ECTS courses directly related to those areas. Additionally, the curriculum contains 89 ECTS for strategic and communication level skills, 108 ECTS for technical level skills, and 50 ECTS for monitoring and evaluation level skills.
Conclusions: The eHealth strategy expertise and the curriculum are well aligned, especially regarding the technical level skills. The department and the ministry must work together so that the students get practical experiences of all the courses during their study.

Keywords: eHealth, Ethiopia, Developing country, Health informatics education, Success

1 Introduction

The use of information and communication technology (ICT) to support healthcare services is rapidly increasing. Public healthcare organizations, in most developing countries, are becoming increasingly reliant upon ICT to support healthcare services by improving the ability to collect, manage, analyze and report information in all areas of healthcare [1].

eHealth generally is defined as the use of ICT for health and in a broader sense the World Health Organization (WHO) defines eHealth as "a method concerned with improving the flow of information, through electronic means, to support the delivery of health services and the management of health systems" [2]. For national healthcare systems it is used to improve the timeliness and accuracy of public health data reporting and to facilitate disease monitoring and surveillance activities as well as supporting sector-wide planning by improving the ability to plan, budget and deliver services.

Ethiopia is at a pivotal moment in its efforts to improve the health status of its people and address health inequities. As the country has made progress in reaching the health-related Millennium Development Goals, the government realizes that these advances need to be accelerated if targets in the areas of maternal and child mortality and infectious diseases are to be achieved [3]. eHealth is one

*Corresponding author address: Department of Health Informatics, University of Gondar, Ethiopia, Email: Binyam.Tilahun@uni-muenster.de, Tel: +49 (251) 83-58368
 DOI: 10.12856/ JHIA-2014-v2-i2-100

potential avenue to keep this progress. The Ministry of Health (MOH) of Ethiopia has developed and tried various national eHealth applications that include: Electronic Medical Record –(EMR) system, mHealth, Telemedicine, eLearning and other initiatives [3]. Even though most eHealth projects are at different stages, separated initiatives and experiments have created enough interest that health decision makers are beginning to explore how eHealth could be integrated into health systems more comprehensively [4] but according to the ministries report, the lack of well trained, workforce is hindering its progress.

Training knowledgeable, motivated and capable healthcare information technology (HIT) staff is essential for overcoming the barriers to effectively implement eHealth systems. With this firm interest and ambitious plan, it is evident that the country needs health informatics professionals who are aware of the complex health care processes and who can manage, plan, develop and provide expert consultations to the health care sector. To fill this gap, the University of Gondar - one of the oldest research, teaching and community service oriented higher education institutions in Ethiopia - designed a health informatics bachelor's degree program.

The aim of the bachelors' program is to train students who can model, develop and implement different health information system applications as well as evaluate and monitor impacts of such applications within the healthcare organizations. This program is the only bachelor's level health informatics program that bridges the diploma and master training programs in the country. The success of the country's eHealth strategy implementation is highly dependent on those graduates. Therefore it is necessary to ensure that what the students are studying in the university is in line with the eHealth strategy needs. Hence, the purpose of this paper is to review the eHealth strategy of Ethiopia and compare it with the University of Gondar's bachelor program graduate profile.

2 Materials and methods

For this study we performed a comparative document analysis. We reviewed the draft eHealth strategy of Ethiopia [5] and the bachelors health informatics curriculum of the University of Gondar [6]. With the eHealth strategy review, we identified the priority focus areas of the strategy and the type of skills and expertise each of the implementation targets need. After identifying those priority areas, we reviewed the course content of the curriculum and compared it with the main expertise needs of the eHealth strategy.

3 Results

In our review of the draft eHealth strategy, we found out that it is a result-oriented document containing a clear vision of eHealth in the health system of the country. The document contains main rationales, reviews of current infrastructures, human resources, and main components, areas of intervention, financing as well as monitoring and evaluation plans.

The main objective of the strategy is "to create standardized, integrated and harmonized e-health systems to enhance health service delivery" [5]. Moreover, the document identifies specific targets of eHealth in the country in the area of health system enhancement in terms of access, quality and efficiency; expanding evidence based planning and decision making at all levels of the healthcare and standardization of electronic communication and data exchange in the country. Furthermore, the document describes five priority areas in health information systems implementations. They are: Health information systems, Telemedicine, Mhealth, eLearning (for health workforce training) and Community information systems. The strategy document also discusses five strategic areas of interventions for eHealth: 1) adapt e-health standards, 2) implement the national ICT infrastructure 3) establish governance and leadership, 4) educational promotion to all stakeholders on eHealth and 5) support human resource development and capacity building for eHealth (HIT, informatics).

In our review of the curriculum we found out that it is a multi-disciplinary curriculum with a total of 249 ECTS. It comprises of different courses in health, ICT and general knowledge courses. The 1st and the 2nd year of the study have a focus on health courses to provide students with a solid understanding of healthcare. The 3rd and 4th year of the study focus on advanced level informatics course. The last year is dedicated to an internship within a real healthcare setting to get to know different implemented eHealth systems. The details of the curriculum courses and its development approach are discussed in a separate publication [6]. During the comparative analysis of the eHealth strategy needs with the bachelor's

 DOI: 10.12856/ JHIA-2014-v2-i2-100

curriculum, we found out that most of the skill needs of the strategy are covered by course level competencies in the curriculum as discussed below.

3.1 Courses for main priority domain areas

The eHealth strategy identified health information system, telemedicine, and mHealth, e-Learning and community information system as the main priority system applications to be implemented in the country. To respond to those competencies needs the curriculum has11 main courses with a total credit of 62 ECTS.

Table 1. Lists of main courses in the curriculum for the competency of priority health information system domains in the eHealth strategy of Ethiopia.

Strategic and communication level courses	Credits (ECTS)
Health management information system	6
Medical knowledge based systems	6
Health information system practical attachment	6
Telemedicine	5
Mobile health information system	5
Outpatient and inpatient information systems	5
Health information project management	4
Health record system	6
Teaching skill for health informatics	4
Health informatics project I&II	16
Total	**63**

3.2 Strategic and communication level skills

Soft skills are becoming important for health informaticians given the complexity of healthcare eHealth implementations [2]. This competency is covered in 17 courses with a total of 89 ECTS.

Table 2. List of main courses in the curriculum for the competency of strategic and communication level skills in the eHealth strategy of Ethiopia.

Strategic and communication level courses	Credits (ECTS)
Communicative English	5
Civics and ethical education	5
Health service management	5
Health economics	3
General psychology	4
Introduction to sociology	4
Health information project management	4
Basic writing skills	5
Pharmacology	3
Health management information systems	6
Hospital operation systems	3
Team training program	8
Teaching skills for health informatics	4
Entrepreneurship	4
Practical attachment I	8
Team training program	8
Practical attachment II	8
Total	**87**

 DOI: 10.12856/ JHIA-2014-v2-i2-100

3.3 Technical level skills

Courses that are intended primarily to educate the technical competencies of graduates are listed in the following table 3. We found a total of 19 courses with 108 ECTS in programming, infrastructure implementation, advanced level data handling and specific eHealth application courses in the curriculum. The eHealth strategy clearly outlines that health informaticians who are going to work in the health sector (from primary care centers to MOH offices) need to have multidisciplinary technical skills.

From the technical point of view, the curriculum covers every dimension of technical courses including programming, networking, computer maintenance, hospital device maintenance, server installation and management and others. This is in line with the current needs of the health sector. Due to budget constraints and the size of small health centers and clinics, it is difficult to employ health informaticians for all aspects of the hospital. In order to address all the difficulties those professionals need to have multidisciplinary skills to ensure the first site assistance for all technological matters.

Table 3. List of main courses in the curriculum for technical level competencies in the eHealth strategy of Ethiopia.

Strategic and communication level courses	Credits (ECTS)
Fundamentals of ICT to health informatics	5
Fundamentals of health informatics	5
Biostatistics for health informatics	5
GIS & disease mapping	5
Object oriented system analysis & design	7
Discrete mathematics	5
Fundamentals of programming (C++)	5
Data structures and algorithms	5
Internet programming	7
Fundamentals of database systems	5
Information storage and retrieval	5
Medical knowledge based systems	6
Biomedical instruments	5
Computer maintenance & troubleshooting	6
Computer networking and security	6
Telemedicine	5
Mobile health information systems	5
Health informatics project I	8
Health informatics project II	8
Total	**108**

3.4 Monitoring and evaluation skills

For the competency of monitoring and evaluation, there are a total of 50 ECTS courses, including a dedicated monitoring and evaluation course.

Table 4. List of main courses in the curriculum for the competency of monitoring and evaluation in the eHealth strategy of Ethiopia.

Strategic and communication level courses	**Credits (ECTS)**
Epidemiology for health informatics	5
Biostatistics for health informatics	5
Health service management	5
Monitoring and evaluation	5
Health management information systems	6
Health information project management	4
Health informatics project I	8
Team training program	8
Health informatics project II	8
Total	**54**

 DOI: 10.12856/ JHIA-2014-v2-i2-100

4 Discussion and future perspective

Establishing a national eHealth strategy has become a significant milestone in national health system development plans. Having a concrete national plan and a clear vision allow for resources to be appropriately distributed and used. Ultimately, the development of a national strategy is a starting point for the long journey of the vision [7].

We assigned each course to the competency area we believe it primarily affects, based on the objective and content of the course. Generally every course has a direct or indirect influence to all competency areas. This categorization helps us to have a clear understanding of each area and to analyze the requirements with the curriculum content. In the analysis we found out that most of the credit points were part of the technical level skills (108 ECTS), which is in line with the eHealth strategies requirements that explicitly outline the need of more technical professionals in its implementation plan.

Even though, the course content and distribution of credit points to each of the competency areas have addressed most of the eHealth strategy document requirements, we believe that those classroom based lecture and academic level practicum courses are not enough to build the competencies. The MOH, Regional Health Bureau (RHB) and the Gondar university health informatics department need to collaborate closely so that students can participate and get familiarized in the development, implementation and evaluation of different eHealth projects during their study.

The availability of the "Health informatics project I & II" course with a total of 16 credit hours, "team training program" with a total of 8 credit hours and "practical attachment to a healthcare organization" with a total of 8 credit hours are ample opportunities to build this skill. If the students get the opportunity to participate in different eHealth projects during those courses, we believe that will give them the technical, strategic and monitoring and evaluation level skills. For that, the collaboration of the department with MOH and other non-governmental organizations who are involved in eHealth implementation is necessary.

We recommend a further detailed and more comprehensive pedagogical study on how best each competency can be achieved in the curriculum. Additionally, a similar analysis is needed on identifying where the diploma and the master level graduates fit into the eHealth strategy requirements.

5 Conclusion

The eHealth strategy of Ethiopia and the bachelor health informatics curriculum at the University of Gondar are in alignment to cover the skill and expertise needs for effective implementation of eHealth programs in Ethiopia. However, the department of health informatics and the MOH need to work together so that the students get practical experiences of all the courses during their study period.

Acknowledgements

We would like to acknowledge all the people involved in the development of the Ethiopian national eHealth strategy document and the Health informatics curriculum of University of Gondar.

Statement on conflicts of interest

There is no conflict of interest.

6 References

[1] Vital wave consulting, "Health Information Systems in Developing Countries," Vital wave Consult. no. May, p. 69, 2009.
[2] WHO and ITU, "National eHealth Strategy Toolkit," WHO Libr. Cat. data, vol. W26, no. 5, 2012.
[3] N. ELIAS, "Special bulletin," MOH Spec. Bull., vol. 15th Annual, no. 15, pp. 43–46, 2013.
[4] N. Framework, "mHealth in Ethiopia Strategies for a New Framework," MOH Publ., vol. 6, no. 1, 2011.
[5] M. Engida and M. Kifle, "eHealth Strategy 2013-2015," 15th Annual. Rev. Meet. Spec. Bull., vol. 6, pp. 43–47, 2013.

 DOI: 10.12856/ JHIA-2014-v2-i2-100

[6] B. Tilahun, A. Zeleke, F. Fritz, and D. Zegeye, “New bachelors degree program in health informatics in Ethiopia: curriculum content and development approaches.” Stud. Heal. Technol. pp. 798–802, 2013.
[7] C. Hamilton, “The WHO-ITU national eHealth strategy toolkit as an effective approach to national strategy development and implementation.” Stud. Health Technol. Inform., vol. 192, pp. 913–6, Jan. 2013.

 DOI: 10.12856/ JHIA-2014-v2-i2-100