

Electronic Health Information Systems Critical Implementation Issues (E-HMIS): District Health Information Software Version.2 in the Greater Bushenyi, Uganda

Hussein Muhaise^{a*}, Dr. Margret Kareeyo^b

^a*School of Computing and Information Technology, Kampala international University*

^b*Senior Lecturer, School of Computing and Information Technology, Kampala international University*

^a*Email: hmuhaise@yahoo.com*

^b*Email: magsterkami@gmail.com*

Abstract

This study focuses on identifying critical implementation issues for the electronic health information systems (E-HMIS) in view of District health Information Software version.2 (DHIS2) in the greater Bushenyi Districts Uganda. This is a system that was rolled out nationwide in August 2010 by Ministry of Health Uganda and for the past six years it is believed to have been operational. However, studies in the developing countries context like Uganda, E-HMIS continues suffer low success because several factors in the context of developing countries that are often not put in consideration before implementation [1, 7, 8, 11, 13, 14, 15, 20, 24, 25]. A survey conducted in the five districts that make up the greater Bushenyi indicated that there was lip frog when implementing this system across the country because vital equipment and personnel were not prepared and put in place. The percentage of staff trained and dedicated to the electronic system is so low 22%, staff un skilled in computer applications 59%, supply computers into health facilities is very low and most health facilities are not connected to any power source that are essential for system success.

Keywords: DHIS2; DHO; DSS; E-HMIS; Greater Bushenyi Districts Uganda; HIS; Information Systems.

* Corresponding author.

1. Introduction

A Health information systems (HIS) are a set of interrelated components working together to gather, retrieve, process, store and disseminate information to support the activities of the health system planning and decision making both in management and service delivery [21, 22]. Sinha [28, 29] recognized Health Information systems to include Decision Support Systems (DSS) National Health Management Information Systems, Hospital Information Systems, Integrated Disease Surveillance Systems, Patient Data Management systems, and Clinical Information Systems.

The World Health Organisation promotes nations to invest in Health information systems and statistics to improve Country, Regional and global Health information management. This information is vital for public health decision making, health sector reviews, planning and resource allocation, programme monitoring and evaluation [30]. The use of Health information Systems in Uganda are more beneficial as they ease record keeping, enhance communication, perform simple calculations, support decision making, facilitates gaining competitive advantage, better management of chronic diseases, faster retrieval of record, improving process flow and productivity [17, 18, 24].

Monitoring of the Sustainable development goals in particular the 3rd “ensure Healthy lives and promote wellbeing for all at all ages” this goal directly relates to health and can be monitored by functional health information systems [11].

In Uganda Health information Systems date back to 1985, it aimed at capturing and analysing data on specific communicable diseases. This followed a series of revisions and by 1997; it brought on board data on human resource, financial resources, drug and medical equipment to the disease and activities routine reporting. It involved use of huge paper forms that were filled and forwarded to the MoH resource centre. This was unlikely to provide levels data quality required by all stakeholder due to allot of error, inaccuracies and incompleteness [18, 23, 22].

District Health Information Software Version 2 (DHIS2) is “ an integrated web based, country owned and managed, national health information system that integrates quality data used at all levels to improve health service delivery” [9,10].

Uganda invested highly in the implementation of an electronic health information system (District Health information Software version2) with the major focus on integrating health data to improve health services delivery. All the health facilities in Uganda use the system to capture vital data on health indicators [16].

Basing on previous studies into electronic health information systems implementation in developing countries position continued to depict negative success because several factors in the context of developing countries that are often not put in consideration before implementation [1, 4, 7,8, 11,13, 14,15, 20,24,25,26,27, 31, 32].

This is the major motivation for this study to identify the lying issues into implementation of DHIS2 in the greater Bushenyi Districts Uganda a developing country

2. Study design

The health facilities in the greater Bushenyi Districts were involved in the study. Both public and private including private not for profit were included in the study. Health facilities including HC2s, HC3s, HC4s and Hospitals were visited.

The study targeted staff that were directly involved with the use of the system that understood the system and its purpose.

2.1 Sampling procedure

The sample size was determined by purposive sampling relying on the researcher's judgment when it came to selecting units to be studied. Only a particular sub set of the people with whom the researcher has interest was included. It excluded those that didn't fulfill the conditions of the researcher in mind. According to Bach [5], in purposive sampling the researcher decided what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience. For this case DHTs and health facilities using DHIS2 system will be selected to determine DHIS2 success factors.

2.2 Sample size

There are 127 health units in the greater Bushenyi Districts (MoH, 2010). Therefore this becomes a finite population. Basing on Krejcie and Morgan (1970) [19], theory of ample size determination, it yielded 92 samples for inclusion in the study. 92 questionnaires were administered, 73 (78.0%) questionnaires were returned well filled, 8 (8.6%) were returned poorly filled and 11 (11.9%) were never returned.

2.3 Data analysis

The collected data was analyzed using statistical package for social scientists (SPSS version 20.0) for descriptive statistics that summarized the numeric data. This was deemed very precise and objective for this study.

3. Findings

The study findings are presented below.

3.1 Information about District participation to the study

Data was collected in the greater Bushenyi Districts including:- Bushenyi, Buhweju, Mitooma, Rubirizi and Sheema at health facility level and DHO offices as represented below:

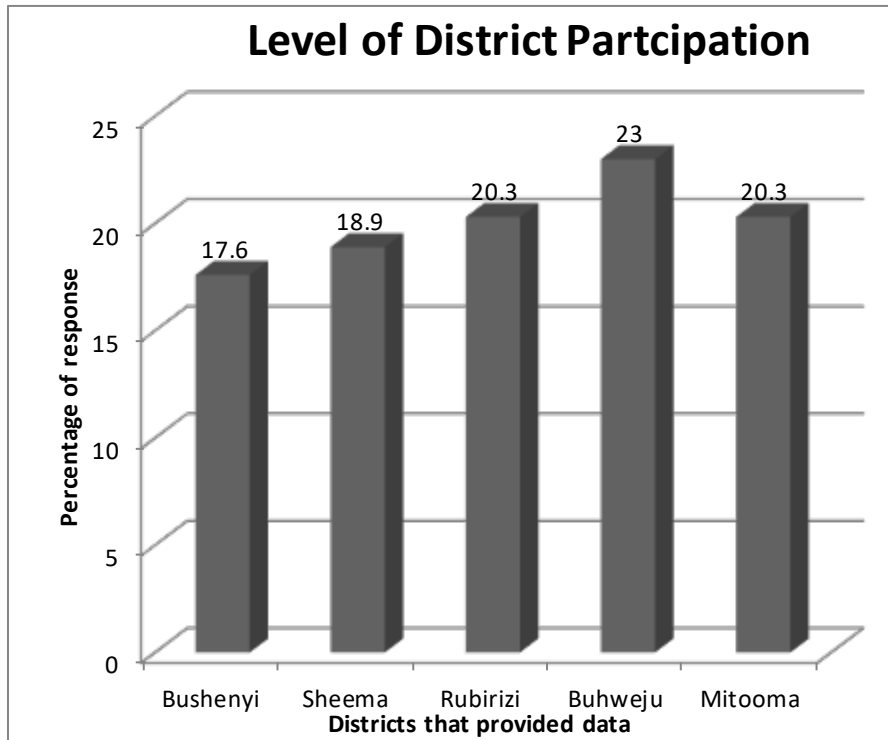


Figure 3.1: Districts participation into the study

Most data was collected from Buhweju district (23%) followed by Mitooma and Rubirizi (20.3%) Sheema (18.9%) and Bushenyi (17.6%)

3.2 Computer distribution with in the health sector in the greater Bushenyi

The study probed into computer distribution with in the health sector in the greater Bushenyi Districts. The findings are as follows:

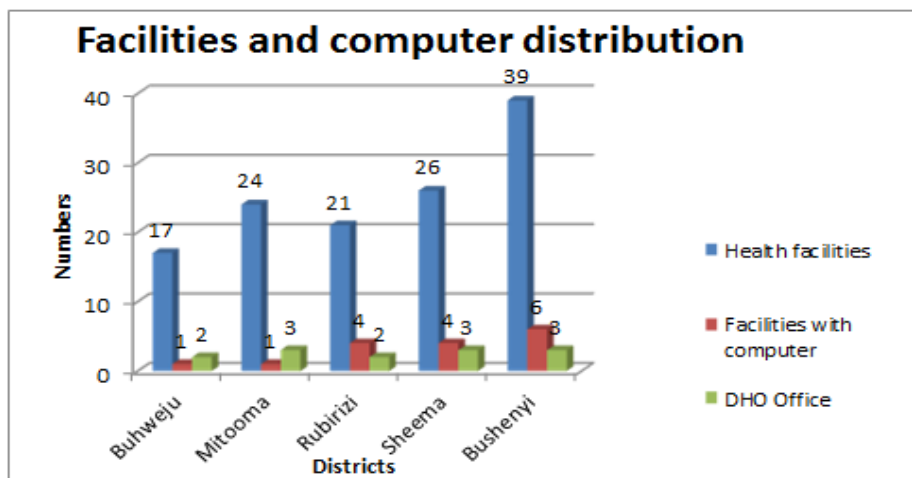


Figure 3.2: Computer distribution per District in health department

Table 3.1: Computer distribution per District

District	Total units	No. Health facilities with computers	DHO Office	% units with computers
Bushenyi	39	6	3	15
Buhweju	17	1	2	6
Rubirizi	24	1	3	4
Mitooma	21	4	2	19
Sheema	26	4	3	15

Despite the efforts to computerize the Health management information systems, much data is still collected on paper forms and transmitted to DHO office for processing, this is still a similar position that existed before implementation of DHIS2. Health facilities do not have computers to computerize the data as can be seen from figure 4.2 and table 4.1 above.

3.3 Health units with Source power

The probe into power supply to health facilities revealed that only a few health facilities have a connection to the power while many are distant to power grid of electricity and no alternative power supply is available there.

Table 3.2: Power supply to health facilities

District	Total units	No. Health facilities with power connection
Bushenyi	39	6
Buhweju	17	1
Rubirizi	24	1
Mitooma	21	4
Sheema	26	4

3.4 Job Mix of staff in the health facilities

The study identified that only 22% of the staff were dedicate to Health Management Information Systems as ICT staff, Biostatisticians, Health Information officers and Health Information Assistants. The ICT staff and Health information Officers were found in PNFP health facilities where as public facilities had Biostatisticians who reside at district and a few health information Assistants at health Sub Districts and health center 3s.

Table 3.3: Staff job mix with in health facilities in the districts

Job mix	Number	Percentage
Doctor	3	4
Clinical Officer	22	30
Nurse	33	46
ICT Staff	1	1
Biostatistician	4	5
Health Information Officer	5	5
Health Information Assistant	5	8
Total	73	100
% staff dedicated to System	22	

3.5 Staff level of computers Skills

It was identified that 59% of the staff were not skilled to use computers and other technology devises like modems, basic office applications and searching the web is not possible for the majority of staff.

Table 3.4: staff skills to using computers

Level of computer skills	Number	Percentage
Highly skilled	8	11
Skilled	22	30
Unskilled	43	59
Total	73	100
% ICT unskilled	59	

4. Recommendations

The study recommends that MoH Uganda should review the post implementation of DHIS2 to avert negative success of the system and thus provide necessary resources for system success like computers and sources of power to health centers. The districts should employ dedicated staff to E-HMIS as only 22% was found to be on ground. And need to train all staff into usage of ICTs so that they can benefit from other resources provided by ICT over the internet like telemedicine and benchmarking from other health facilities globally. The study focused on only five districts of Uganda out of 114 districts. It is therefore of paramount importance to scale the study to all districts to get a general nation picture of DHIS2 implementation to compare the results

5. Conclusions

The study identified that DHIS2 in the greater Bushenyi Districts is sleeping with critical issues that have been

responsible for many HIS failures across the developing countries. Considerations for the investment into the system already its failures is detrimental. Measures should thus be taken by responsible arms of Government of Uganda to mitigate the system failure.

References

- [1]. Adesola, M. S., Baines, T. & Darlow, N. 2015. Mipim: Framework for Business Process Improvement.
- [2]. Al- Mamary&Aziat (2013). The Impact of Management Information Systems: Adoption in Managerial Decision Making: A Review of Management Information Systems. 8: 010-017
- [3]. Alvarez, R. 2011. Lessons Learned in Orchestrating a National e-health Movement. Conference.
- [4]. Amanyire G, Wanyenze R, Alamo S, Kwarisiima D, Sunday P. (2010). Client and Provider Perspectives of the Efficiency and Quality of Care in the Context of Rapid Scale-up of Antiretroviral Therapy, *AIDS Patient Care STDS*, 24: 719-27
- [5]. Bach, Belardo, Bajwa, Kantharaju and Prasanth (2011). Factor analysis in measuring information systems Effectiveness. *Proceedings of the 2011 ASEE Northeast Section*
- [6]. DeLone, W.H., & McLean, E.R. (2008) Measuring e-Commerce Success: Applying the DeLone& McLean (1992) Information Systems Success Model. *International Journal of Electronic Commerce*, 9: 31-47.
- [7]. DeLone, W.H., and McLean, E.R. (2003) Information systems success: The quest for the dependent variable. *Information Systems Research*, 3: 60-95.
- [8]. DeLone, W.H., and McLean, E.R. The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*, 19: 9-30.
- [9]. DHIS 2 (2013). DHIS 2 Documentation. URL <http://www.dhis2.org/deployments> accessed December 18, 2015)
- [10]. Douglis, C. (2012). USAID/Kenya HMIS. URL <http://kenya.usaid.gov/programs/health/1213> (accessed September 15, 2015)
- [11]. Ehab Azhary Seed Ahmed, Mohammad Nazir Ahmad, Siti Hajar Othman, (2016) Health Information System Critical Success Factors (HISCFs): A Systematic Literature Review. *Journal of Information Systems Research and Innovation* 10(1), 29-39, February 2016
- [12]. Gable, G., Sedera, D., and Chan, T. (2008). Re-conceptualizing Information System Success: The IS-Impact Measurement Model. *Journal of the Association for Information Systems*, 9 (7): 377-408
- [13]. Heeks R. (2006). Health Information Systems: Failure, Success and Improvisation. *International Journal of Medical Informatics*, 75(2), 125–137.
- [14]. Heeks, R. (2002). Failure, Success and Improvisation of Information Systems Projects in Developing Countries. *Development Informatics Working Paper Series*, No.11, 2002. Retrieved from <http://www.sed.manchester.ac.uk/idpm/publications/wp/di/diwp11.pdf>
- [15]. Kelegai, L. (2005). Elements Influencing IS Success in Developing Countries: A Case Study of Organisations in Papua New Guinea. PhD Thesis. Queensland University of Technology.
- [16]. Kiberu et al., *BMC Medical informatics and Decision making* 2014, 14:40 <http://www.biomedcentral.com/1472-6947/14/40>
- [17]. Kihuba et al., (2014). Assessing the ability of Health Management Information systems in Hospital to

- support evidence based – informed decisions in Kenya: *Glob Health Action* 2014, 7: 24859 - <http://dx.doi.org/10.3402/gha.v7.24859>
- [18]. Kintu P, Nanyunja M, Nzabanita A & Magoola R: (2005). Development of HMIS in poor countries: Uganda as a case study. *Health Policy Dev* 2005, 3(1):46–53
- [19]. Krejcie, R.V., & Morgan, D.W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, 30, 607-610. Retrieved May 2, 2016, from <http://people.usd.edu/~mbaron/edad810/Krejcie.pdf>
- [20]. Krishna, S. and Walsham, G. (2005). Implementing Public Information Systems in Developing Countries: Learning From a Success Story. *Information Technology for Development*. 11(2):123-144
- [21]. Lippeveld T & Sauerborn R (2000). A framework for designing health information system. *Design and Implementation of Health Information Systems*. Geneva, World Health Organisation: 15-31.
- [22]. Mandelli .A, Giusti .D: Utilizing the Health Management Information System (HMIS) For Monitoring Performance and Planning: Uganda Catholic Medical Bureau Experience. Available at: <http://www.ucmb.co.ug>
- [23]. Ministry of Health, Health Systems 20/20, Makerere University School of Public Health: Uganda Health Systems Assessment 2011. Kampala, Uganda and Bethesda, MD: Health Systems 20/20 Project, Abt Associates Inc; Available at: <http://health.go.ug/docs/hsa.pdf>. Accessed July 10, 2015.
- [24]. Namakula.S and Mayoka .K.G, (2014) Examining health information systems success factors in Uganda health care systems. *Journal of global health care systems* /volume 4, number 1 (2014)
- [25]. Paul Mukasa Ssemaluulu (2012). An Instrument to Assess Information Systems Success in Developing Countries, Phd Thesis , University of Groningen, Netherlands
- [26]. Petter, S., DeLone, W., & McLean, E. (2008). Measuring information systems success: models, dimensions, measures, and interrelationships. *European Journal of Information Systems*, 17 (3), 236-263.
- [27]. Seddon, P.B. (1997). The A respecification of the DeLone and McLean model of IS success. *Information systems research*, 8:3
- [28]. Sinha, R. (2010). Impact of Health Information Technology in Public Health. *Journal of Biomedical Informatics*, 1(4), 223-36
- [29]. Tilahun, B., & Fritz, F. (2015). Comprehensive Evaluation of Electronic Medical Record System Use and User Satisfaction at Five Low-Resource Setting Hospitals in Ethiopia. *JMIR Medical Informatics*, 3(2), 22.
- [30]. World Health Organization (WHO). 2015. World Health Statistics. Geneva. Available at <http://www.who.int/whosis/whostat/2015/en/index.html>.
- [31]. Ziembra, E., & Obłąk, I. (2015). Change management in information systems projects for public organizations in Poland. *Interdisciplinary Journal of Information, Knowledge, and Management*, 10, 47-62.
- [32]. Ziembra, E., Papaj, T., Żelazny, R., (2013) A Model of Success Factors for E-Government Adoption – The Case Of Poland. *Issues in Information Systems*, 14(2). 87-100.