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Interfacing Research and Policy in Informing Data Management for Quality Data in Health Information Systems: Case of DHIS2 in Malawi

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Introduction
Like in many other fields, there is an ever-growing need for new knowledge in health services delivery on how health service providers should improve their decisions in delivering health care. In attempting to respond to that desire for knowledge, universities and other institutions have been funding and motivating students and academicians carry out research in health management information systems. The expectation is that the knowledge generated from the research will inform improvement in HIS practices.
Method
This qualitative desk research attempted to answer the question how research, policy and practice in health information system interface to inform design and implementation of health information systems. The study adopted an intrinsic case study methodology. The study used District Health Information Systems 2 in Malawi as a case. It reviewed PhD and masters students' theses, Health Information System Policy and Strategy documents to explore how these resources inform each other. Data analysis was done through thematic tabular analysis, and themes were derived from a predefined set of criteria.
Results
The findings showed that there is considerable effort by researchers to publish and share their findings with practitioners through conferences, journals and working together in workshops. It also shows that participation in a policy formulation workshop has been a key means by which researchers directly contribute to health information systems management practices.
Conclusion
The paper has attempted to answer the question how research, policy and practice in health information system interface to guide design and implementation of health information systems. The findings have shown that there are considerable efforts by stakeholders in health service delivery to create and make use of platforms that should enable the interaction between researchers and practitioners. Apart from that, the findings have also stimulated a need to conduct a detailed field study to ascertain how actually the researchers inform practitioners on the ground.

Keywords: Research, Health Information System Policy, Practice, DHIS2

1 Introduction

One of the areas where Information and Communications Technology for Development has dominated debate is health service delivery. Access to quality data for decision making and telemedicine are among notable themes in literature [1], [2]. In data management, the work of Weiskopf and Weng [3] has led to the development of a data quality model in health information systems. This model and others have been benchmarks for defining practices and implementation of systems for data management with aim of attaining quality data for decision making. Sahay and Walsham [4] demonstrated the various ways through which health information systems contribute towards a better world for all. In their study titled *"Building a Better World: Frugal Hospital Information Systems in an Indian State*" they highlighted ability of health

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information systems in strengthening processes to include the disadvantaged, empowering patients through access to information and use of technology to make voice of the voiceless in the rural areas be heard.

Researchers have also argued that through e-health, for example, there is potential for Information and Communication Technology (ICT) to expand access and improve efficiency in health service delivery especially in rural areas [5], [6]. Similarly, work of Thapa and Sein [2] articulated how affordances of ICT are actualised using a telemedicine case in Nepal. The literature above demonstrates that there is a lot of research work towards understanding how ICT is important in health service delivery. However unlike in other disciplines like education, for example, not much has been documented in relation to the link between research, policy and practice.

Through Health Information Systems Program (HISP), under the leadership of University of Oslo in Norway, there has been active research by students and professors which has seen the inception and evolution of the District Health Information System (DIHS) across the developing countries. DHIS, now at version 2, provides a platform for data management for Health Information Systems in many countries across the globe from Africa to Asia [7]. Despite that the research findings and recommendations have been published through conferences, journals and books, there has not been substantial research and reports on how actually these findings inform policy formulation and indeed the development of features in the DHIS as it evolves. This desk study was motivated by an attempt to explore how researchers and practitioners interface to translate research knowledge into an improvement in health information systems. The research uses a case study of DHIS in Malawi.

1.1 Problem statement

Literature shows there has been a lot of research on the role information technology in health service delivery [6], [8] [9]. Health Information Systems, data quality and eHealth are among areas which have been debated by many scholars in journals and conferences. Similarly governments' health departments and health partners have been articulating health information systems policies and strategies to govern the use and application of information technology in delivery of quality health services [10], [11], [12]. However, despite the enriching research findings, policies and strategies, not much has been researched or say documented on how these resources interface each other in attempt to achieve a common goal of quality and accessible health service to all. This concern motivated a systematic tracking of research and related health information system policies and strategies so as to understand how they talk to each other in trying to achieve a common goal, particularly of attaining quality data which should inform decision making for improved access to quality health for all.

1.2 Aim of the study

This desk research aimed to explore how research work practically contribute towards policy and strategy formulation and implementation. Specifically; it aimed to find out how the development of policies and strategies benefits from research findings. It further aimed to find out which features in DHIS2 have indeed be implemented in response to the policies and strategies.

1.3 Conceptual framework

In an attempt to shape and structure the relationship among the concepts being studied, the researcher developed a conceptual framework shown in *Figure 1*. This artefact was drawn from the work of Miles and Huberman [13] who defined a conceptual framework as "*a visual or written product, one that "explains, either graphically or in narrative form, the main things to be studied".*

The main concepts in the framework are *research*, *practice* and *product.* Where research points to the a systematic investigation to discover facts or collect information [14] and practice is being looked at as the actual application or use of an idea, belief, or method, as opposed to theories relating to it [15]. From the same dictionary the researcher defines product as a thing or person that is the result of an action or process [15], which in this study relates to such things as agreed practices and information systems.

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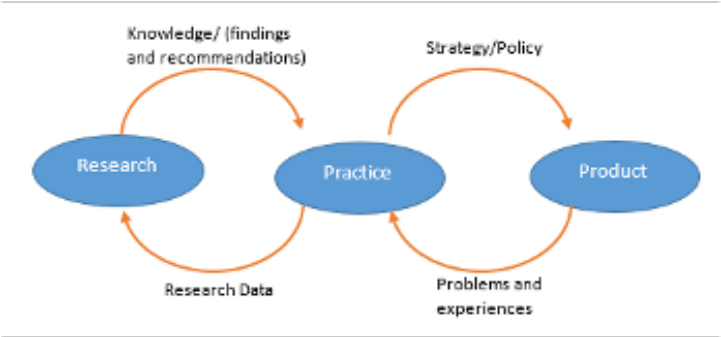

Figure 1: *Conceptual Framework*

2 Methodology

This study was a qualitative desk research which used intrinsic case study methodology. It attempted to answer the question how research, policy and practice in health information system interface to inform design and implementation of health information systems. Purposive random sampling was used to select journal or conference articles and policy or strategic documents. PhD and masters students theses also formed part of the data sources consulted where the main inclusion criteria was that studies or documentation should relate to health information systems development and implementation with reference to District Health Information Systems (DHIS 2) in Malawi. The researcher focused on documents within 2010 and 2016 timeline and 2015 to 2018 research work and strategy documents respectively. The systematic search was however not limited to local sources and it extended to international journals as long as they conformed to the set criteria. Table 1 gives a summary of the artefacts that were consulted in the study.

Table 1: *Summary of data sources*

	Thesis		***Article***		***Reports***	
Title	PhD	MSc.	Journal	Conference	Strategic	Policy
1. *Monitoring, Evaluation and Health Information Systems Strategy (MEHIS)-2018*					√	
2. *Natinal Health Information System Policy-2015*						√
3. *Implications of Integrating Information Systems in Healthcare at District Level in Malawi: A Case of DHIS and Drug LMIS-2010*		√				
4. *Management and Use of Health Information in Malawi and Burkina Faso: The Role of Technology-2016*				√		
5. *The information transparency effects of introducing league tables in the health system in malawi-2016*			√			
6. *Strengthening Health Management Information Systems in Malawi: Gaps and Opportunities-2015*				√		
7. *Developing Integrated National Health Information Systems in Malawi: Challenges and South-South Collaboration-2011*				√		
8. *In Search of the Missing Data :The case of maternal and child health data in Malawi-2010*	√					
9. *Transformational Feedback: Breaking the vicious cycle of information use in Health Information Systems-A case from Malawi-2016*	√					

Nine (9) documents were collected online and the researcher focused on the recommendations. The researcher summarised the crucial recommendations which were then used as a benchmark for evaluating the health information systems strategy or policy documents and the DHSI 2. The evaluation was to

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ascertain if these three resources: research recommendations, strategy or policy and technology (DHIS 2) implementation talk to each other. For each specific recommendation, the researcher checked for either a corresponding policy or strategic item in the strategic or policy document. Wherever relevant, the implementation of the same was checked in DHIS 2 in form of either feature or functionality. The same approach was also used to check practices in terms of use along the data processing chain in the DHIS 2.

3 Findings

The paper titled *"Strengthening Health Management Information Systems in Malawi: Gaps and Opportunities"* [16] provided a very good structure of the findings in this study. Without being specific as to which paper, the finding in that paper guided the thematic structuring of the findings in this study. Three themes were hence drawn from the study of the various data sources presented in methodology section: (i.) improving data processing practices and use (ii.) inclusion of informal data sources (iii.) capitalising on the strength of integration in data management systems.

The proponents of improving data processing practices and use recommended support to all involved in the data processing. The support highlighted included training of personnel or providing self-explanatory kit that users can train independently, introducing mobile app for reporting, peer based reviews, league tables, transformational feedback and information behaviour culture and use especially among managers [1] [16] [17] [18] as the aim of introducing health information systems and platforms like DHIS 2 is to get quality data, others argued that data cannot be complete if informal sources are not included. This led the researchers to recommend inclusion of informal sources of data like births at Traditional birth attendants [19]. Another interesting finding was about capitalising on the strengths of integration in data management systems. In their studies [20] [21] argued that several information systems especially at district levels operate independently. Duplicate data within the same institution was reiterated as a common concern arising from such a situation. Although both authors focus was more leaned towards integration approach, they articulated the need for integrating health information system and this work focused on the latter than the former.

Moving on to the findings in relation to practitioners, the paper starts by defining strategy and policy. Among the many definitions, strategy is defined as "*a plan of action designed to achieve a specific goal* [22] and policy is defined as *"a set of ideas or plans that is used as a basis for making decisions, especially in politics, economics, or business"* [23]. Although there are technical differences but for purpose of our study, we focused on plan of actions or ideas meant to achieve a certain goal, which in this case is the goal is to improve data quality for decision making.

Common findings between the two documents included actions to: improve interoperability (this was meant to reduce increased independent data management platforms), enhance continuous support across all levels of data management (through training and mentorship), strengthening capacity to use data, actions to reduce workload especially to those in data collection and finally strengthening community structures including chief in supervision of data collection and submission [10] [12].

Another finding that is worth highlighting was that the strategy and policy documents demonstrated evidence of a collaboration culture among the practitioners and the researchers, where minutes of policy and the strategy development activities indicated presence of some of the researchers in the formulation workshops and DHIS 2 platform development processes. ***Figure 2*** summaries the overall findings showing the alignment of the three artefacts.

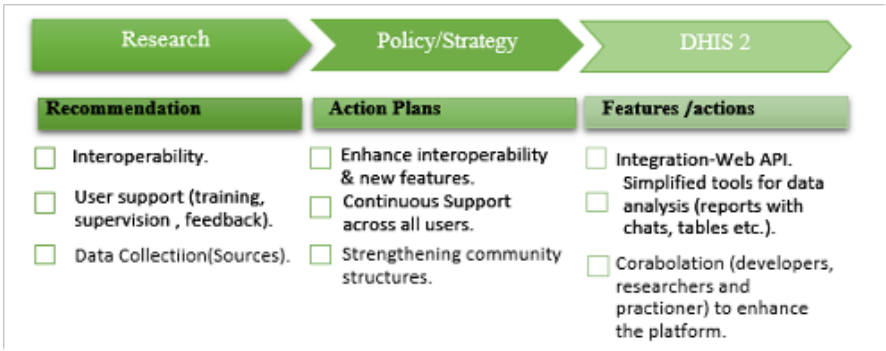

Figure 2: *Graphical illustration of research, policy and strategy and DHIS2 platform alignment*

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4 Discussion and conclusion

Looking at how the policy and strategic action plans are well aligned to researchers' recommendations gives a substantial evidence that the practitioners work is being guided by the researchers' findings and recommendations. There is considerable effort by stakeholders to create and make use of platforms that should enable the link between researchers and practitioners [24]. The symbiotic relationship between researchers and practitioners propels the vehicle of knowledge to new destinations. Researchers formulate research problems from practitioners' experiences. Through systematic studies, the researchers are able to find answers to problems faced by practitioners [25]. However, publishing research findings in journal articles, or participating in conferences or other research dissemination seminars, does not always guarantee that the knowledge will be applied, there are so many factors which may motivate practitioners to put the new ideas into use. Also as illustrated in the conceptual model, product of policy and research, may not always be tangible like an information system. At times it could be a set of practices which are difficult to observe on a desk research if they are really being implemented. Although the findings cannot be generalised as in any intrinsic case study [26] , I posit that research, policy and health information systems developers interface mostly through workshops than in conferences or reading journal articles in Malawi. The findings are evident in other studies which have highlighted how workshops have been integral in knowledge transfer between researchers and practitioners [27] [28]. For example, studies in Burkina Faso showed that workshops involving researchers and practitioners have helped to increase chances of knowledge to be put into practice [29]. However this differs from Kenyan experiences where publications in peer reviewed journals and conferences have been acknowledged as common means of dissemination [30]. The researcher call for further research to ascertain how local conferences can best be capitalised to enhance the existing means of sharing knowledge and implementing new ideas in Malawi Health Management Information Systems.

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