Design reality gap issues within an ICT4D project: an assessment of Jigawa State Community Computer Center: PhD/IPID Track at Sixth International Conference on Information and Communication Technologies and Development (ICTD2013), University of Cape Town, December 7 - 10 2013, Cape Town, South Africa

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ABSTRACT

This paper evaluates the Jigawa State Government Community Computer centre project using the design reality gap framework. The purpose of this was to analyse the shortfall between design expectations and implementation realities, in order to find out the current situation of the project. Furthermore to analyse whether it would meet the key stakeholder's expectation.

The Majority of Government ICT Projects is classified as either failure or partial failure. Our research will underpin a case study of Jigawa State Community Computer centre project. To support our argument we conducted a qualitative case study in which we conducted two interviews, and a survey to find out the current status of the project. Our findings indicated that the project can be classified as a partial failure because few of the centres, operating in some areas of the community, offered socio-economic advancement.

Our results also indicated that the project design reality gap is quite significant. This gap occurred due to poor planning and implementation of the project. Our research reveals several challenges that could impact upon the successfulness of the project provide a foundation for further research and add to existing literature. The challenges associated with the project we identify include poor state of power supply, lack of community engagement during the project planning and implementation, lack of commitment from the Local Government Administration. Our research has potential in adding ICT4D literature, reveals how ICT4D project evaluation can be carried out using design reality gap framework and provides guideline for policy makers.

Keywords:

ICT4D, ICT4D project evaluation, Evaluation, Design reality gap within an ICT4D project, Jigawa State, Community Computer centre

1. INTRODUCTION

Information technology (IT) is the application and usage of computers which have become essential in modern societies. This technology helps to efficiently process data and produce information that help in making strategic decision and save time. While the role of Information and Communication Technology (ICT) in fostering socio-economic development is generally accepted, the application process through which this may happen remains unclear (Thapa and Sein 2010). ICTs are widely adopted as a platform for development, however, considering the nature of ICT project implementation, the impact level, although significant, is still at a threshold level, due to the disconnection between ICT formulators and public sector reformers and governance specialist (Hanna 2010, p1). The case is similar with the Jigawa State Government in Nigeria. The state from 2000 to date, has invested a significant portion of its budget in formulating and implementing ICT policies for achieving sustainable economic development. The popular state ICT4D intervention package include the creation of a community computer centre for ICT literacy, deployment of IP network and computer applications for government data processing, as well as oversees scholarship for ICT studies.

This research will focus on the evaluation of community computer training centre's using the design reality gap framework. The design reality gap approach can be applied for various evaluation purposes. It can be applied during pre-implementation, post-implementation and mid-implementation (Heeks, 2006). In this research we are applying the framework for mid-implementation evaluation, since the project is still within its life cycle. The mid-project evaluation is a combination of both the backward-looking post hoc component that would understand what had happened on the project so far, but also with a forward-looking pre hoc component that would identify future courses of action for the eGovernment project managers Lessa et al (2012, p 12).

The research begins with the research background, followed by review of relevant literature and research method. The final part of the research discusses the findings and highlights any key issues associated with project, and concludes with recommendations of how to make the project a reality and set the agenda for further research.

2. BACKGROUND OF THE RESEARCH

Jigawa state Government established 27 computer training centres across the state in 2005. The centre's are part of its developmental framework which aims to achieve a 100% computer literacy rate in the state civil service, and 25% among the adult population of the State, by the year 2012, which will provide empowerment, and help in alleviating poverty (Jigawa State Comprehensive Development Framework 2009).

The centres are highly equipped with cutting-edge ICT training and learning equipment, ranging from computers, networks, and other peripherals. All the centre's are planned to offer different computer training, which ranges from hardware maintenance and engineering, basic IT training, software development, ecommerce to system analysis and design, and more (Jigawa State Comprehensive Development Framework 2009).

The project is now eight years old, however, no assessment has been carried out to evaluate the state of the centers, and to what extend the project has achieved its major aims and objectives. Such research is crucial, considering that Jigawa state is attempting to achieve a strong position as an ICT state and pacesetter of ICT4D in Nigeria. Many State Governments of Nigeria are joining Jigawa in studying their

ICT4D intervention policy, and majority of those states are replicating a similar policy. No proper research was conducted to evaluate the viability of the community computer centre's, as such this research identifies issues associated with the project, and provides policy guidelines for future implementation.

3. THEORETICAL FRAMEWORK

3.1 The eGovernment design reality gap issue

The management of ICT projects is a challenging task, with many projects failing to achieve their intended objectives (Chen and Latendresse, 2003). Many Governments do not critically examine the causes for project failure, and this prevents them from learning their mistakes (Hillam and Edwards, 2001). The case of Jigawa State Government is no exception, as more money is being invested in the ICT project, without looking at the success of or failure of the project.

Failure can be classified as partial failure, in the sense of not delivering all of the anticipated benefits, or in extreme cases, outright failure or abandonment of the system (Flowers, 1996). Although high levels of ICT project failure have been widely recognised as the most pressing problem facing the ICT profession, there is still no clear accepted definition, of IT project failure (Hillam and Edwards, 2001). Lyytinen and Hirschheim (1987) identified four major types of failures:

(1) Correspondence failure

(2) Process failure

(3) Interaction failure

(4) Expectation failure

Most eGovernment initiatives in developing countries fail in some way (Ndou, 2004; Dada, 2006). 35% of e-government implementations in developing/transitional countries can be classified as total failures (project never started, or started but immediately abandoned) and 50% are partial failures (major goals are not attained and/or there are undesirable outcomes). (Heeks (2008), Heeks and Stanforth (2007). The research, estimated an expenditure of US$3 trillion, on information technology (IT) projects by governments, between 2000 and 2010; with an overall failure rate around 60%, thus wasting huge amounts of money. Similar results can be seen in Jigawa State, even though no proper research has been conducted to ascertain the level of the design reality gap.

There are many theories and explanations offered as to why IT projects fail in developing countries; Some identify the cause as a specific issue, such as lack of commitment on the part of political leadership and public managers (Bhatnagar and Schware, 2000). Others identify slightly broader causes, such as the poor management of long-term sustainability risks (Aichholzer, 2004). Others try to provide a comprehensive and contingent model, such as the "design-reality gap" framework (Heeks, 2002; Heeks, 2006).

The above theory clearly indicates that majority of eGovernment projects in Africa fail to achieve their aim, or only partially achieve their aim. If the costs associated with projects, as stated by Heeks (2003): Direct financial; indirect; opportunity; political; beneficiary and future cost), are known and properly quantified by the project shareholders, the rate of the failure would be significantly reduced. Most of the stakeholders however are not aware of the associated costs of the project and can't easily be quantified.

Fundamental to eGovernment success and failure is associated with the amount of change between 'where we are now' and 'where the e-government project wants to get us'. 'Where we are now' implies the current realities of the government situation. 'Where the eGovernment project wants to get us, means the model or conceptions and assumptions built into the project's design. eGovernment success and

failure therefore depends on the size of the gap which exists between 'current realities' and 'design of the eGovernment project'. The larger the design-reality gap, the greater the risk of e-government failure. The smaller the gap, the greater the chance of success (Heeks 2003, p3).

In analyzing eGovernment project failure Heeks (2003, p3) stresses the need to adopt and use the ITPOSMO acronym dimension and eGovernment design-reality gaps which produces the model for understanding success and failure of eGovernment, as shown in figure below:
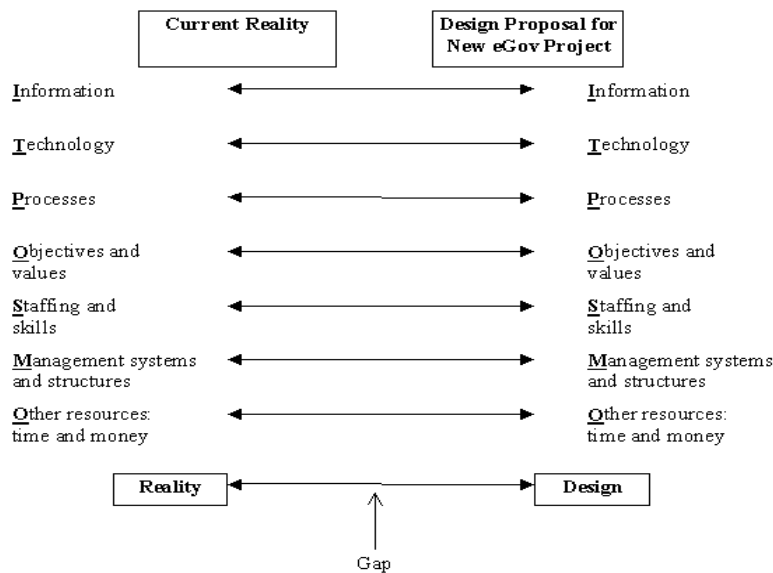

Figure 1: The ITPOSMO Dimensions of e-Government Project Design-Reality Gaps

Richard (2003) also provides guidelines on how to reduce eGovernment failure by assessing design-reality gaps, determining action, and applying a generic and dimensional approach towards reducing risk.

The issues presented above clearly stress the need to adopt a participatory approach toward achieving a successful eGovernment project. The majority of eGovernment failed projects in Nigeria are associated with the design reality gap problems, considering that end users of the application are not critically consulted during planning and implementation, equally the designs are not effectively matched with the actual reality of the issues the system need to addressed.

The design reality gap approached can be used in various different modes (Heeks, 2006), for example, it can be used pre hoc; that is, before an eGovernment project commences, in order to predict the likelihood of that project succeeding or failing, and to identify key sources of project risk. It can also be used post hoc, that is, after an eGovernment project has been completed, in order to analyse the reasons why the project succeeded or failed. In this research we want to use it during mid implementation or Durante hoc as applied by Lessa et al (2012, p 12) in their research. The mid-project evaluation is a combination of both the backward-looking, post hoc component, that would understand what had happened on the project so far, but also with a forward-looking pre hoc component that would identify future courses of action for the eGovernment project managers Lessa et al (2012, p 12).

As its name suggests, the essence of the framework is to understand the various gaps between the design of the eGovernment project (which can be thought of as "where the eGovernment project wants to get us": the conceptions, assumptions, expectations of a new future that are built into the project design) and the current realities of the implementation context (which can be thought of simply as "where we are

now"). The design-reality gap is thus the gap between where we are now and where the design wants to get us: the larger that gap, the more it is associated with project failure; the smaller that gap the more it is associated with project success Lessa et al (2012 p 4).

3.2 Evaluation of government ICT investment

The relevance of ICT investment towards government transformation is of paramount important, as clearly argued by Hanna (2010, p15) The ICT revolution, combined with the forces of globalisation, has provoked intense hopes and fears in developing countries. The hopes associated with ICT revolution cannot be limited to its relevance in building a knowledge-based, innovative-driven, and networked economy. However, the fear associated with the revolution, is to be excluded from the knowledge and learning loop, failure to surf the wave of change could lead to being left irremediably behind and therefore unable to compete. If ICT strategies are effectively deployed in a structured organizational process, with competent human resources it will generate sustainable economic growth, empower the poor, and extend public health and educational services.

ICTs are widely adopted as a platform for development, however, considering the nature of ICT project implementation the impact level and significance are still at a threshold level, due to higher disconnection between ICT formulators, public sector reformers and governance specialists (Hanna 2010, p1).

Heeks (2002) stated that there are growing numbers of eGovernment projects, and these were slowly diffusing within Africa because of a lack of 'e-readiness for eGovernment', he stresses that, there is general failure of governance in Africa due to crisis, the crises cannot be limited to input (poor income and heavy debt), process (waste, delay, mismanagement and corruption) output (poor delivery in agriculture, education, housing, health, social welfare and many more sectors). These issues can be improve when ICT packages are efficiently aligned with the process, considering Africa competitiveness in terms of Natural and human resources.

4. RESEARCH METHODOLOGY

The qualitative case study particularly interpretive approach was applied to the research problem. The philosophical basis of interpretive research is inherited from the ethnographic research tradition in anthropology, hermeneutic, and phenomenology (Butler, 1998; Klein & Myers, 1999; Walsham, 1995a). Interpretive approach can better explain the complex socio-technical interaction process using ethnographic interviews, thick case description, and empirical observation. (Devinder 2011).

4.1 Case study

Jigawa State, Nigeria lies between latitudes 11^oN and 13^oN and longitudes 8^oE and $10^o35'$E and covers a total land area of about 22,410 square kilometres. The state is bordered on the east by Bauchi and Yobe States, on the west by Kano and on the north by Katsina and Yobe States and by the Republic of Niger. Jigawa State was created on Tuesday August 27, 1991 (Jigawa, 2012).

4.2 Data collection and analysis

We collected the research data through interviews, observations, and survey, from October 2012 to January 2013. To obtain primary data, we interviewed the former executive secretary of Jigawa State Basic Education Board who also doubled as the Permanent Secretary of the Ministry of Basic Education and Human resources development, who is the chief policy maker for the planning and implementation

of the community computer centres, and the current chairman of Jigawa State Universal basic education Board, who is in charge of the centers now. The two interviews were mainly semi structured and lasted between 15 and 25 minutes, they were conducted at Abuja and Dutse. To obtain the current situation of the centres, we conducted visits to 10 out of the 27 computers centres, to ascertain their current situation. In addition, we administered a mobile survey to obtain data from the remaining 17 computer centres which were not visited.

4.3 Findings, analysis and discussion

The qualitative data collected was recorded using ITPOSMO dimension, and the rating was carefully interpreted using guidelines in Heeks (2008a) and are presented in table 1 The interpretation was scale from zero to ten, the zero scale indicated there is no change between design and current reality, while ten means there is complete change between the design and current reality as applied by Lessa et al (2012, p 6).

The data presented in table 1 had a final score of 34, the scoring of the project was conducted using ITPOSMO guideline as in table 2. The scaling and scoring clearly indicated that the project is in a partial failure category and might continue to be so unless actions are taken to close remaining design-reality gaps.

Factor	Design	Reality	Score/10
Information	The project information is not available to all the project stakeholders.	Some stakeholders usually those benefitted with the interventation are aware of little project information.	8
Technology	The centres are fully equip with all the necessary technology to operate.	Power supply have hindered the centres to fully operate, there is need for alternative energy and general equipment overhauling.	6
Process	The project process strategy is not well aligned with the state developmental policy.	Some benefitting community has started reformulating the centre training policy and are actively engaged in running the centre	4
Objective/Value	To achieve 100% computer literacy in public service and 25% in the general population.	The objectives are not in line to be achievable, unless proper strategy is put in place.	8
Skills/Staff	Well trained staffs are deployed to the centre.	The staff are well trained many have acquire higher qualification	1
Management/structure	There is no proper management structure in the centers.	Only few centres has proper management structure.	3
Other (Time/Money)	There is no proper budget for the centre.	Some centres are receiving significant fund from the Local Government and community.	2
		Total score	34

Table 1 ITPOSMO SCALING AND SCORING

Total gap score	Interpretation
0-14	The e-government project has largely been successful, and is likely to continue to be so.
15-28	The e-government project is likely only a partial success, and might continue to be so unless actions are taken to close remaining design-reality gaps.
29-42	The e-government project is likely a partial failure, and will likely continue to be so unless gap-closure actions are taken.
43-56	The e-government project is a failure of some kind, and this will continue unless gap-closure actions are taken.
57-70	The e-government project is and will remain close to a total failure without significant action to close design-reality gaps.

Table 2 Interpretation of total Mid Implementation Design reality Gap score adapted from Lessa et al (2012, p 6)

The results of the survey conducted, reveals that of the 27 computer centres created by Jigawa State Government, only 6 operated or partially operated. Of the 21 centres not open for training: lack of power connectivity, lack of funding from local government to power the alternative power backup (Generator), and nonpayment of staff salary prevented them from operating.

The results of the first interview conducted with the current executive Secretary, indicated that there is poor planning of the entire project, and the centres aims and objectives are not properly aligned with the Jigawa state Governments policy of sustainable development. He stressed that his current administration is working towards making the policy sustainable and achievable. He also indicated his readiness to accept our results and outcomes for making the computer centre policy achievable.

The result of the second interview with the past Executive Secretary revealed that there was poor planning and implementation of the project, proper stakeholder engagement was not carried out. He revealed that the entire project is independent of other Government development policy, as no curriculum was developed for the centers; he maintained that even though he chaired the entire project, no full pledge autonomy was given to him with regards to the centres. He advised that Government need to bring all active and passive stakeholders onboard while making any ICT policy, considering the nature of high level design reality gap of the past project. He also indicated that the project

Information, Objectives and values are not well circulated to all the project stakeholders which causes the project to lack transparency and focus.

From our findings we discovered that all the 27 centers have qualified **staff** with all the necessary **skills** to deliver, but failure by Government to pay their monthly salary and other fringe benefits results in them not to operate the centers. We also discovered that the centers are fully equipped with all the necessary **technologies,** ranging from Computers, Generators, and Networks to operate, the supporting **resources** such as running and maintenance cost, are not provided and this cripples most of the centers and resulting in them not operating.

5. RECOMMENDATIONS AND CONCLUSION

Our findings indicate that the project design reality gap is considerable, this gap occurred due to poor planning and implementation of the project. Our research reveals several challenges which have resulted in part of the project not being realised, such as, poor state of power supply, lack of community engagement, during the project planning and implementation, and a lack of commitment from the Local Government Administration.

From our research we have drawn the following recommendations to bridge the gap:

Information:

The project information needs to be available to all the stakeholders. Furthermore, the benefiting community needs to be fully informed about the project, as this will then enable them to be fully engaged and contribute to the success of the project.

Technology

The centers have all the necessary technology to operate, however, considering the centres ares eight years old, the equipment needs to be overhauled/replaced and some new equipment for example projectors, need to be acquire.

Process

The computer training program needs to be strategically aligned with public service requirements, and the training program should be formulated from public service and agency for poverty alleviation input, and should be properly reviewed within a short time interval.

The Jigawa State ministry of education science and technology, Youth development etc should be mandated to serve as a regulator and adviser of the centres.

Objectives and Values

The project aims and value as clearly stated in Jigawa state development framework is to achieve 100% computer literacy rate in the state civil service and 25% in the state population, this will only be achievable when it is well informed to the stakeholders and they are actively engaged as owners of the project. Their input and commitment will be use as a yardstick in further evaluation.

Staffing and Skills

As clearly stated in the discussion part of this paper, the centres have core staff to deliver all the training, however, their salary and other fringe benefits need to be regularly paid. Other motivational programs should be developed to reward outstanding centre managers, training and development programs should also be developed to update the center's staff.

Management systems and structure

The structure of the centres needs to be clearly spelled out, the communities need to be properly involved in the ownership and management structure of the centres. The centres ownership was

transferred from State to Local Government in 2005, however, majority of the local Governments failed to take the full control of the centres, the state Government should mandate them to take full control of the centres and provide monthly reports.

Other resources

The centres should be mandated to internally generate revenue to compliment the monthly allocation in acquiring and maintaining its resources.

This paper has setup an agenda for further research and provides guideline for policy makers; already we planned to discuss the findings of the paper with Jigawa State Government ICT4D policy makers and we look forward to partnering with them to make all the computer centers operational.

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