Important aspects in ICT4D projects – towards a model for quality assessment

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Abstract
Information and Communication Technology for Development (ICT4D) is an approach adopted to improve the socio-economic situation in poor countries. It includes e-learning, open and free software, e-democracy, digital media, e-government, capacity building and infrastructure development. Billions of dollars are invested in such programs financed by international aid organizations, state funded aid agencies and multinational private companies. Well known problems are poor infrastructure, crime and poor adaptations to the socio-cultural context. It is a complex multidisciplinary, multi stakeholder and multimedia field with an emerging theoretical framework.

This paper identifies and examines important quality aspects of ICT4D projects and provides empirical ICT4D examples illustrating each aspect. The overall research question in this study is: What makes some ICT4D projects more successful than others?

Based on the authors own experience of projects in Sri Lanka, Uganda and Vietnam as well as analysis of other projects, the following quality aspects are considered as crucial for successful implementation of ICT in development projects: 1) Authentic local needs, 2) Local ownership, 3) Realistic limitations, 4) Competence network, 5) Communication strategy, 6) Planning horizon, 7) Documentation/measurable results, 8) Resources and sustainability and 9) Fun/Motivation. The relevance of these aspects are discussed and exemplified in the article.

The thematic areas identified provide a basis for an emerging model, intended to be useful in the design and planning phase as well as in monitoring and evaluation of ICT4D projects.

Key words: ICT4D, development projects, success aspects, quality assessment
Introduction

Improvement of aid effectiveness is a top priority for the global community. Both donors and receivers want best possible outcomes of the investments done in order to achieve desired specific results. The overall objectives for aid work from a global perspective are outlined in the internationally agreed upon millennium goals. The United Nations Millennium Declaration is a short, concentrated document with eight sections; the first section explicitly stating international values and principles and the following seven sections are thematic areas with specific key objectives intended to be achieved by 2015. 189 heads of states have agreed to fulfill the specific objectives concerning: 1) Peace, security and disarmament; 2) Development and poverty eradication; 3) Protecting our common environment; 4) Human rights, democracy and good governance; 5) Protecting the vulnerable; 6) Meeting the special needs of Africa; 7) Strengthening the United Nations.

A new paradigm changing the view on how to conduct aid projects efficient has evolved in recent years, in particular manifested in the widely accepted Paris Agenda (2005) and the Managing for Development Results (MfDR) approach provided by OECD Development Cooperation Directorate (DCD-DAC) (2008). The Paris agenda specifies 12 indicators of progress to be measured nationally and monitored internationally. These indicators are categorized in five thematic areas: 1) Ownership; 2) Alignment; 3) Harmonization; 4) Managing for results; 5) Mutual accountability.

The MfDR approach means: "... focusing on concrete impacts at all phases of the national development process. A concrete structure and set of tools have been developed to enhance government performance and to boost accountability at all levels. The MfDR approach embodies generally accepted tenets of good governance – setting clear objectives, evidence-based decision making, transparency, and continuous adaptation and improvement." (Managing for Development Results, 2008, page 1).

Assessments are necessary for rational decisions on the continuation of prevailing projects as well as decisions about future projects. For instance, the scarcity of funds for general development, decision making in policy formulation and public management is strongly dependent on continuous evaluation of the impact of development concepts, tools, activities and results. Furthermore, a general framework is indispensable when evaluating developmental factors, or evaluating the importance of a project in terms of efficiency, effectiveness and sustainability. Whether investments in projects may have an impact on the relationship between costs and results must be evaluated in advance. Some attempts have been made for providing particular as well as general frameworks for evaluations and to suggest instrumental methods for assessing projects.

However, a general problem when drawing any conclusions from earlier experiences is that not so much has been done in advance for facilitating a systematic evaluation of the various projects. In this paper we use a systematic empirical approach in a field which normally is discussed from a theoretical, deductive or policy perspective.

Aim

The main objective of this study is to contribute to a useful model for quality assurance of ICT projects in developing countries. A set of guidelines is generated based on analysis of selected case studies. The intention is to identify quality aspects of relevance for the whole project life cycle, from the pre-study phase to the final evaluation of a project.

1 [Millennium goals, 07/09/2008]
2 United Nations, 2000
3 [End of Poverty, 07/09/2008]
Methods and material
This paper is based on the following three case studies: 1) The EU funded AsiaLink/eBIT project in Sri Lanka, which is focused on curriculum development for e-learning, 2) A study at Makerere University in Uganda about the use and experience of ICT, and 3) An evaluation of a SIDA-project for ICT support for the visually impaired in Vietnam. An overview of material and methods used is presented in the table below.

Table. Cases, data and methods.

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Data collection procedure: AsiaLink/eBIT, Sri Lanka
During 7 visits to Sri Lanka in 2006-2008 about 15 lectures, 30 hands-on workshops and 3 questionnaires has been the base for further discussions with the UCSC Dean, subject matter experts, Instructional designers, content developers, administrational staff and students. In August 2006 and May 2007 the Swedish project participants were invited to the meeting with representatives for eBIT facilitating places. In the eBIT program the actual teaching and most of the facilitating is done in private facilitating places around the island. During May 2007 and July 2008 Swedish experts visited facilitating places and telecentres and conducted informal interviews with staff and students.

On distance, via the Internet, the Swedish participants have joined the Sri Lankan virtual discussion forums were eBIT course issues have been discussed. The discussions have mainly been held in the virtual learning environment Moodle.\(^4\) In a strive for regular contacts, project meetings have been held on distance in the virtual conference system Polycom.\(^5\) On several occasions Swedish people have attended staff meeting and internal development seminars. One example is the eBIT staff conference for course development in the eBIT semester 4 in Negombo, March 2008. Data was collected from all the above mentioned informants in order to provide a valid and balanced view of the project’s implementation, impact and relevance. Critical issues and problems was analyzed and discussed in particular

Data collection procedure: Makerere University, Uganda
Informal interviews were carried out at Makerere University with 4 lecturers and 11 Students. The lecturers interviewed were attached to the Institute of Public Health, Department of

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\(^4\) [Moodle, 24/09/2008]

\(^5\) [Polycom, 24/09/2008]
Dentistry, Faculty of Education and Faculty of Computing and IT. The students were attached to the Faculty of Economics, Faculty of Computing and IT and the Institute of Psychology.

The objective of the interviews was twofold 1) to develop an understanding on what is ground in relation to the perceived usefulness of the use of e-learning in supporting teaching and learning activities and 2) to provide information that will be used to inform the design of the explorative empirical study plan. However, it is worth noting that the results obtained so far are not fully representative and continued interviews will be carried out in a follow up study. The results obtained after substantive interviews will guide the development of a model for effective utilization of e-learning to support teaching and learning activities in the higher education context.

The main construct of the discussion held with the lecturers and students was based on their perceived usefulness of using e-learning and how used it in their teaching and learning activities. However, from the discussions held while the infrastructure to support e-learning was in place, there was limited and in some cases no uptake of e-learning. The discussions were then centered to address the challenges faced in adopting the use of e-learning in their teaching and learning activities.

Data collection procedure: ICT Training for the Visually Impaired, Vietnam

During a 14 days visit to Vietnam in September 2007 formal interviews were made with teachers, students and staff at the VBA branches in Hanoi, Hai Phong and Ho Chi Minh City. Deep interviews and more informal discussions were held at the NDC School in Hanoi. Questionnaires were sent to selected persons in advance by email from Sweden. In Sweden deep interviews were made with project participants from Iris Hadar and the Swedish organization for the visually impaired (SRF).

The major part of the project documentation was analyzed and followed up by email questions to project participants. The evaluators attended meetings and discussed the project with involved people from Sida, SRF and Iris Hadar in Sweden and with staff at VBA, NDC School and the Embassy of Sweden in Vietnam.

The diverse cases selected provide a broad basis for inductive generalization. We use the analytical framework of grounded theory originally developed by Barney Glaser and Anselm Strauss\(^6\) and this approach’s guiding principles when analyzing the data\(^7\). The point of departure is to start with data, not to test a hypothesis. The analysis process consists of coding key information, abstracting these to central concepts and categories a finally create the model with the most important thematic areas. It is not a linear process from data to overarching concepts, but rather an iterative process, where data generates ideas for key concepts and tentative key concepts are tested against the empirical material.

Results and discussions

AsiaLink/eBIT – A model for net based learning

This is a project in the EU framework that now is in its final phase. A realistic expectation is that the specific objectives most important factor, to raise the pass rate in the University of Colombo School of Computing (UCSC)\(^8\) eBIT programme, will be reached. One of several reasons for the good work on the Sri Lankan side is the relevance of the first overall objective: “To satisfy

\(^7\) see also Charmaz (2006); Dey, (1999) and Glaser (1998).
\(^8\) [USCS, 03/07/2008]
some of the demand of work force created in Sri Lanka by the expansion of ICT-related economic sectors.\footnote{AsiaLink/eBIT, 01/07/2008}

It is often a lot easier to succeed when the economy is growing and when there exists clear realistic objectives, but it has to be in cooperation with skilled local expertise and a committed project team. A combination, that sometimes is a contradiction as well, at universities where the salaries are significantly lower than in the ICT sector. It is not always the case that people do like Dr. K. P. Hewagamage did, when he returned from Japan back to UCSC to lead the construction of a national eLearning programme.\footnote{Hewagamage, 03/07/2008} It is of great value to have someone that cares about the activities 365 days a year.

Another important task is how to arrange an international network of excellence and avoid too many generalists in the activities. There is no easy solution when the ICT field attracts many of the most skilled in developed countries as well. What is necessary is to split the responsibilities and not try to solve too many problems at the same time. In the AsiaLink eBIT project the pedagogical part is organized by Stockholm University - Dept of Computer and Systems Sciences (DSV)\footnote{DSV, 05/07/2008}, and the improvement of online assessment is run by Delft University of Technology (DUT)\footnote{Delft DUT, 05/072008}. One experience from the eBIT project is that the more the human resource network grows, the bigger the need will be of a common documentation.

The eBIT project is a continuation of a series of Swedish aid projects where earlier contacts and experiences can facilitate the long time planning and add some agility to the collaboration. After the completion of the eBIT project the Swedish – Sri Lankan exchange will be followed up in a Sida\footnote{The Swedish International Development Cooperation Agency} funded project on building a national eLearning centre in Sri Lanka.

Overall impression: Except for the fact that Sri Lanka is in a state close to a civil war, both the aid projects and the common ICT development are doing well in the country. The series of ICT aid projects, not only from Europe, have certainly done some impact. In the AsiaLink eBIT project the objective with an increase of the pass rate from 2 to 5 % in the eLearning courses will be more than fulfilled and the production of eLearning content has now reached a level where UCSC has begun to export eLearning. During the last years UCSC has started to arrange ICT conferences and training courses for participants from other developing countries. At the same time as Sri Lanka during the coming years will leave the state of being a developing country, the eLearning Centre and the eBIT programme will have good chances to be sustainable and continue their expansion.

Lecturers’ and students perception on e-learning at Makerere University, Uganda

Makerere University implemented an e-learning project funded by Carnegie Corporation, New York. The project aims at ensuring quality graduates in the public and private sector with the key competences to ensure that Uganda joins the knowledge society. The University adopted a blended learning approach with a high percentage of face to face engagement. To date the progress has been in terms of providing infrastructure, with challenges in the human aspects relating to staffing, training mindset among others. The University is currently using Blackboard and KEWL (open source) as their learning management systems.

Lecturers’ perspective: The lecturers’ raised the following concerns in relation to the adoption of e-learning in their teaching activities:

\footnote{[AsiaLink/eBIT, 01/07/2008]}

\footnote{[Hewagamage, 03/07/2008]}

\footnote{[DSV, 05/07/2008]}

\footnote{[Delft DUT, 05/072008]}
o *Large student numbers* pose challenges related to online support and management of the students. The lecturer: student ratio in some cases is 1: 800, without assistants to help them manage the courses even in the traditional face to face mode.

o *Access to computers* was another issue affecting the adoption e-learning at the Makerere University. While the University has continued to support access to computers, there are still not enough computers for the students. In this regard, the lecturers were hesitant in developing online course as they thought this would be a wasted effort as their courses would not be accessed by the students.

o *Lack of computer skills* is another issue that was raised. Most of the lecturers and students lack skills that are mandatory for effectively utilizing technologies in their teaching and learning activities. This has greatly affected the uptake of e-learning as the students cannot readily rely on lecturers for support in an online environment. While the students in some cases get peer to peer support, the lecturers on the other hand especially the old generation do not have the enthusiasm to acquire this skill. The lecturers further noted lack of skill to integrate the pedagogical aspects with technologies in order effectively support student learning.

o *Lack of time* to develop and manage online courses was another issue that was raised. The lecturers felt that there was no adequate time to develop and administer online course.

o *Lack of Management Support* in spearheading the development of e-learning from the unit to the top management level. The lecturers pointed out that at unit level efforts for developing online courses are not recognized and are seen as a personal rather than unit initiatives. At the top management level, the e-learning policy has not been operationalised thus the reluctance in the adoption of e-learning.

**Students’ perspective:** The students raised the following concerns in relation to the adoption of e-learning in their learning activities:

o *Lack of tutor support* within the face to face and online environment. This they attributed to the large student numbers which overwhelms the lecturers. The students pointed out that lecturers provide limited support at the end of a lecture, through the question and answer session. Clarifications outside the class can be sort through peer discussion, with limited and in some cases no contact with the lecturer. This was further affirmed by one of the interviewed lecturer’s who state that “…*There are too many students in my class. I can not answer all their questions during the allocated class session. I give them a consultation time slot once a week; however I cannot see all of them during this time*…”

o The students further pointed out the lack of lecturer computer skills for drive the adoption of e-learning in their learning activities. In this regard, one of the students asserts that “*….the lecturers need to be informed about the latest development in technologies that will support student learning….*”

o The students also make mention the lack of computer facilities to access online resources. However, while several challenges impacting on the adoption of e-learning were pointed out, the lecturers and students also provided their thought of added value of using technologies to support their teaching and learning activities which included:

  o Access to study material
  o Sharing information and discussions
  o Skills leading to opportunities
  o Tracking students’ personal development

**Overall impression:** It was evident that teachers generally perceived ICT as an added burden and extremely time consuming. They feared in particular a communication overload if students had new opportunities to contact them. In addition to low ICT skills and no ideas how technology could instead save time and provide student feedback in a sustainable way, the ICT uptake
among staff was low. The lecturers’ habits also impacts on the non-changing teaching style. Teachers could repeatedly deliver the same lecture, without much interaction week after week, and did not consider a more student centered mode. It was also obvious that students had an enormous need for interaction and communication in order to solve their tasks and understand the lectures. A “student emergency support group” had formed spontaneously among up to 60 students, who by mobile phones, computers and meetings communicated in order to solve their university tasks and interpret lecturer’s intentions, material and lessons. The platforms and ICT tools provided to staff were largely unused, but these resources were in high demand among students, who however could not utilize them.

Sida/VBA – ICT Training for the Visually Impaired in Vietnam
Quite often projects are initiated by an enthusiastic person with a strong wish to make a vision come through. This was the case in the Sida project for ICT support for visually impaired in Vietnam when the Swedish artist Elisabeth Persson wanted digital support for her art projects at the Nguyen Dinh Chieu School for the blind in Hanoi. Later her ideas was elaborated and extended by Sida, The Swedish Association of the Visually Impaired in Halland and The Vietnam Blind Association, but there has to be someone that takes the very first step.

The idea of adding art and music into a project for basic computer training worked very well at the NDC School. At the other participating schools in Hanoi, Hai Phong and Ho Chi Minh City the training curriculum were a bit different but what they have in common is that the project activities made a very positive change to the daily life of the persons that participated in the ICT training. This training was given by the Swedish company Iris Hadar with a special pedagogy composed for computer training for blind and visually impaired. Even if the, very ambitious, project objectives never were reached the impact on an earlier neglected group was very positive and the 10 week ICT training program has been replicated, prolonged and amended by local teachers at the involved schools.

From initially being a very Swedish project both the practical computer training and the ownership of the project later moved to the Vietnamese side. This project could rightly be criticized for a weak pre-study and a vague outline, but sometimes lack of planning can be compensated by commitment and local engagement. But what could have been improved by a well defined baseline is the projects cost-efficiency.

Overall impression: More than by identifying an authentic local need the project was initiated by an assumption of a general global need. Despite the low cost efficiency the impact is obvious. In the deep interviews with the course participants 100% of the interviewed answered that the course had improved their daily life situation by giving them new channels of information and new digital communication tools.

The fact that the projects main objective was far from reached must be seen more as a result of unrealistic ambitions than project mismanagement. Creating employment opportunities for visually impaired persons is a hard task in developed countries as well. All training components organized by Iris Hadar were well planned and carried out in a friendly and professional manner. All of the interviewed teachers in Vietnam mentioned that the Iris Hadar led training course had inspired them to use new pedagogical techniques.

Even if the outcome was successful, the critique of the limited pre-study remains and the monitoring and documentation were insufficient.

14 [Iris Hadar, 06/07/2008]
15 [Sida-Vietnam, 06/07/2008]
Conclusions
This paper is mainly based on the analysis of three ICT4D cases. By means of empirical generalization from these cases we arrive at nine important thematic aspects to consider in ICT4D projects planning and implementation, see the figure below. The concluding thematic aspects are further explained and related to the cases in the section below.

Figure. Factors of importance for successful ICT4D projects.

Authentic local needs
If you, like in Sri Lanka, have an undoubted great need of work force in a particular field, a project for an appropriate education to satisfy this demand must be adequate. But of course, to fulfill the main need you have to address all the needs related to the education as well. In the Uganda case the needs where clearly expressed by students, however not at all acknowledged by teachers and therefore implementation was not successful.

Local ownership
In Uganda the ICT tools was not tailored to teachers need and they were not adequately educated in how to use them. The platforms used was donated by international donors and not really integrated in daily use. Local ownership was an important factor for successful Telecentres in Uganda as we concluded in an earlier study.\(^\text{16}\)

Realistic limitations
To satisfy some of the demand of work force in the ICT-sector in Sri Lanka by expanding an existing 3 year programme on university level seems to have a reasonable probability of success. The main objective for the support for visually impaired in Vietnam was much harder to reach. In Vietnam the actual time of training for the original group was not more than 10 weeks.

\(^{16}\) Hansson, Kivunike, Mozelius (2008).
Even if the pedagogy and syllabus worked well, this is not enough to build a ground for an employment however fast the domestic ICT-field is growing.

**Competence network**
In order for a project to work, it must consist of a team with all necessary skills and knowledge, alternatively a feasible plan for developing the skills lacking within the project. In Uganda there was a need for teacher education about the pedagogical use of ICT. Also supporting staff needed to be expanded in order to implement ICT and support teachers better.

**Communication strategy**
An explicit and agreed upon plan for the monitoring communication is needed: How, when and about what. This aspect is especially important since partners in ICT4D projects typically are working with long distance interactions and also face cultural and language differences. To avoid poor monitoring as in the Vietnamese case, harnessing the web2.0 communication tools available today could substantially improve quality. The Uganda students used their own mobile phones and telecentre facilities, but supporting their communication by making platforms and forums available would enhance their learning capacities. The Uganda teachers needed a model to communicate with large number of students in an effective way.

**Planning horizon**
Oftentimes long and medium term planning is lacking. Without clear, explicit planning of visits, activities and deliverables a project will not reach its potential. This however does not mean that adaptations and modifications should not be made. The need for a reasonable planning horizon is a general quality aspect concluded from a wider experience of projects not only in ICT4D but also in EU projects. The responsibilities are on all involved partners, but in particular the coordinator. Planning as well as communication of the planning with a good time perspective allows involved participants to prepare and control their work situation. In the Sri Lankan project some activities have not been scheduled with a sufficient time frame, which impacted on the outcome.

**Documentation/measurable results**
The value of careful and accessible documentation can be illustrated by the Vietnamese case. If successful work packages are intended to be transferred and reused this would be so much easier if structured documentation are available and public. ICT4D projects are in most cases focused on practical aspects and making things work. But poor and neglected documentation of implementation processes and results is not consistent with the Paris Agenda agreement of transparency and accountability. Easy to use ICT tools such as blogs, wikis and home pages could be used for documentation purposes.

**Resources and sustainability**
The more the project ownership could be transferred from the donor side to the receiving country the better for the sustainability. In the Vietnamese case this was obtained by personal non-planned initiatives but what is preferable is if this could be part of a common strategy.

**Fun/Motivation**
Without joy, enthusiasm and commitment a project will be less likely to be efficient and successful. The social networking among participants should be encouraged. In Uganda students expressed strong commitment and joy of collaborating. Less hierarchical structure empowers people and release energy. However the different responsibilities should be assigned to each individual.
Further research and development

Obviously, this study has had a strong empirical perspective, highlighting some important factors for further analysis. An important line of further research will be to test planned, ongoing and completed projects in a wider selection of cases. For developing an entire corroborated framework, the inclusion of more elaborate quantitative and qualitative approaches is desirable as well, in particular, a systematic multi-criteria decision analytical model and procedure, being able to handle qualitative as well as quantitative statements. This framework will be based on our earlier research around evaluation machinery for these kinds of problems and will considerably facilitate a systematic elicitation of stakeholder values and value structures.

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