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Development of a Shona Early Learner Reading Application on Low-Cost Tablet
(Shona Text-to-Speech Voice)
University of Zimbabwe

FINAL EVALUATION OF TECHNICAL AND FINANCIAL REPORTS

To

AFRINIC Ltd.

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By

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EXECUTIVE SUMMARY

I. CONTEXT AND DESCRIPTION

FIRE is a Grant and Awards program designed by AFRINIC in order to support and encourage the development of solutions to information and communication needs in the Africa Region. It places particular emphasis on the role of the Internet in the social and economic development for the benefit of the African community.

Launched in May 2012, the program is partly funded by two donors: IDRC and SIDA International Development Agencies. In 2013, AFRINIC selected eleven grant recipients which received 10 000 USD each for their project.

The grantees are bound by several obligations, which are among other things:

- Implementation and use of the project funds solely to perform the objectives and activities of their project
- Use the funds in accordance with the budget set out in their application
- Submission of an Interim and a Final Report in accordance with AFRINIC's report guidelines outlined in the Memorandum of Grant Conditions.

II. PURPOSE AND EXPECTED USE

AFRINIC required this evaluation in order to confirm that the project is run in accordance with the following criteria:

- Quality and reliance of design
- Effectiveness
- Efficiency of implementation
- Impact and potential of sustainability
- Replicability

AFRINIC also requires this evaluation to be run on the basis of the Interim and Financial Reports sent by the project in accordance with their obligations.

III.   OBJECTIVES

AFRINIC requires this evaluation to ensure of the following:

- The project meets identified objectives;

- Enhance the Design and the implementation of FIRE programme;

- Demonstrate and Improve the impact of the various projects on the local community;

- Develop recommendations to improve the implementation and the monitoring of future projects;

- Ensure that funds allocated to the various projects are used efficiently and within the initial identified scope.

IV.   FINDINGS AND CONCLUSIONS

The quality of this final report clearly demonstrates the level of commitment and dedication of project team.   A well-defined strategy and methodology was laid out and strictly followed. Control and evaluation steps have been defined to ensure project success and adjustments constantly made to ensure that final goals are achieved.

A thorough assessment was performed and actions implemented to minimize identified risks.

V.   KEY RECOMMENDATIONS

We recommend that project team pay close attention to cost and scope variation so as to ensure complete success of implementation.

THE EVALUATION

1. BACKGROUND INFORMATION

1.1. PURPOSE

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This evaluation is also required by AFRINIC in order to help the project in its implementation in accordance with the Memorandum of Grant Conditions.

1.2. AUDIENCE AND USE

The stakeholders who will make use of the evaluation reports are:

1. FIRE programme – AFRINIC

2. International Development Research Center (IDRC)

3. Swedish International Development Agency (SIDA)

4. The grantees

5. Prospective applicants to FIRE program

1.3. OBJECTIVES

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1.4. METHODOLOGY

The evaluation methodology is linked with the objectives, the evaluation questions and the type of evaluation.

Evaluation criteria	Key Results Areas	Evaluation questions	Data sources
Design	Assess the extent to which the project responds to priority issues and identified objectives.	• Are the project objectives still valid? • Has the project team put in place the appropriate strategies?	• Design documentation. • Project objectives. • Interim and final

		• Are there major risks that have not been taken into account?	technical reports.
Effectiveness	Assess the project major key results.	• Are the obtained results aligned with planed objectives? • Are the results in acceptable both in terms of the quantity and their quality?	• Interim and final technical reports. • Project management plan. • Result monitoring report.

Efficiency	Assess the extent to which:
	
	  - Project plan has been followed;
	
	  - Project reports are up to date.
		• To which percentage has project plan been achieved to date?
		
		• Are expenses aligned with established budget?
		
		• Have data collected archived for future use?
			• Project management plan.
			
			• Monitoring and control reports.
			
			• Financial reports.
			
			• Interim and final technical reports.

Impact	Assess to which extent the project will have a long-term positive impact on local community.	To which extent has the project's general objectives and final goals been achieved?	• Project objectives • Interim and final technical reports. • FIRE programme objectives
Sustainability	Assess to which extent the project has been socially and politically adopted by the local community.	• Will the project contribute to long-term benefits? • Would the long-term benefits be materialized by the implementation of an organization? • What are the costs implications for scaling up impact?	• Project benefits report. • Project cost report. • Project monitoring report.

		• Are there savings that could be made without compromising delivery?	

1.5. TEAM

M. Kenneth SANVI, PMP, is a Canadian Consultant in International Development, specialized in all areas of project management. M. SANVI is a seasoned expert with many audits and evaluations projects in several countries in Africa. He is also a trainer in many areas among which, monitoring and evaluation.

Ms. Rebecca GIDEON, CISA will perform the evaluation of Information Technology aspects of the reports. Ms. Gideon is an experienced Information Technology professional with over seven years of diversified experience.

2.   THE PROJECT

2.1.   CONTEXT

Zimbabwe is in the process of recovering from an economic crisis, which has, among other things, severely crippled the education system. Currently there are thousands of children in the rural areas with little or no access to early-learning material, and in addition a lack of qualified personnel to deploy such material.

UNESCO in a report "Strong Foundations: Early Childhood Care and Education" published in 2007, points out the overlooked advantages of mother tongue based education in the early years. When children are offered opportunities to learn in their mother tongue, they are more likely to engage and succeed in school and in particular, this benefits disadvantaged groups and especially girls.

Digital tablets, especially the touch-sensitive ones, offer an intuitive, rich (in terms of graphics and audio) platform for children to learn, in comparison to the ordinary pen-paper methods. Research has shown that children who have had a more 'interesting' way of learning a certain concept will commit it to memory and apply it better than those who have been pressured to learn it. (Flemmert, J. A. 2006).

Although these tools exist for major languages, currently there is no Android Text-to-Speech (TTS) pack for local Zimbabwe languages, like Shona, and hence no vernacular early learner teaching tools are available.

2.2.   UNDERLYNG RATIONALE

Although text-to-speech (TTS) is common and used in mainly application and programs, there has been no work on developing local languages like Shona. Once the correct phonetic audio sounds are developed to correspond to the Shona International Phonetic Alphabet (IPA) then this can be used for any application on any platform. The project team plans to initially use this library to develop an early learner-reading program for Shona children; however the team anticipates that other applications, for example teaching arithmetic in Shona, will follow.

The Shona phonetic library about to be developed will be open source and available freely on the Internet for others to utilise in other applications.

Once the procedure is understood, the team anticipates developing the same libraries for other local languages such as Ndebele, Tonga and local languages outside of Zimbabwe.

2.3. STAKEHOLDERS AND BENEFICIARIES

2.3.1. Stakeholders
a) FIRE programme – AFRINIC
b) Swedish International Development Agency (SIDA)
c) The grantees
d) Prospective applicants to FIRE program
e) Rural early learner children age 5 and upward
f) Zimbabwe's population

2.3.2. Users

The initial project is focussed on rural early leaner children, from the age of 5 upwards. Project team anticipates that in particular girls and other disadvantaged groups will benefit most from learning in their mother tongue.

Nevertheless, project team has shifted their target more toward children in grades 1 through 3 and in particular children suffering from dyslexia.

2.3.3. Beneficiaries
a) Zimbabwe rural early learner children age 5 upwards
b) Zimbabwe's population in general
c) Project team believes that this technology could also be extended to other languages.

2.4. CONCEPTUAL MODEL

2.4.1. Resources and activities
The project team has considerably grown and now comprises:
i. A Technical director, an ICT expert and three engineering specialists who handles all technical aspects of the project;
ii. A Finance specialist;
iii. And Public relations and marketing specialists to prepare for mass deployment of the product.

2.4.2. Expected results

The primary objective of this project is to design a Shona reading application on a mobile Android platform for early learners. Final results expected are as follow:

1. Design a computerised text-to-speech voice for Shone speech synthesis. The voice must be:

   a. As close as possible to natural speech;

   b. Coherent and easy to be understood by a child.

2. Design an Android application for children, which shall use the local language Shona voice. The application must be:

   a. Easy to use and could be learned intuitively;

   b. Be culturally relevant to rural children.

2.5. RESULT CHAIN AND LOGICAL FRAMEWORK

In an effort to achieve successful results, a clearly defined path was identified and is followed by project team. First, researches were conducted on text-to-speech systems. The team later engaged in creating a Shona phone-set to properly define the language fingerprint. Subsequently, voice creation was done by which audio recordings were made. The last step is now the creation of NatiV, the Android application itself that will teach children how to read the Shona language.

To ensure better adoption of the final product, project team entered in a partnership with a local government primary school. The main purpose of this partnership was derived a curriculum for learning to read based on teachers experienced which will be converted into a digital format.

2.6. PROJECT MONITORING SYSTEM

Various tools and approaches were implemented to evaluate results obtained at different levels of the execution of the project. Among them are:

- Recording software

- Condenser microphones

- Digital mixer

- Digital Signal Processing

- Mean Opinion Score

In effect, control steps are being implemented to analyse results obtained and ensure that they are up to standard. In addition, the application collects datasets of student learning interaction and is able to store it in a remote database for further analysis. Furthermore, project team is completing development that will enable automatic generation of reports.

Another area of improvement being explored by the team is the setup of a datacentre where all resources needed could reside to enable a large-scale operation of the application.

2.7. EVALUATION FINDINGS

2.7.1. DESIGN
➢ Valid objectives

Project objectives remain valid. The intended audience kept to mind and proper steps are being implemented to ensure acceptable results.

➢ Appropriate strategies

The deployment strategy adopted by the project team is dictated by a clear and well-defined methodology. An initial research work to clearly understand TTS system was carried out. Linguistic experts were called to contribution to understand the Shona language and phone-set was developed for it. Recordings were made and tests are to be conducted on them to measure quality and ensure that they are up to standard.

To ensure user adoption, the team has involved teaching professionals, seeking to collect their opinion and suggestions. A working group was formed with two teachers from each grade from grade one to three, to oversee the development activities of the software.

➢ Major risks not accounted for

There was only one risk that had been identified at early stage of the project. It is the impact of having just one technical staff in the project team. Actions were implemented to mitigate that risk. In effect, project team grew considerably and three additional technical resources were recruited compiling together over fifteen (15) years of experience.

2.7.2. EFFECTIVENESS

➢ Results aligned with planed objectives

Project results remain aligned with planned objectives. Team has laid out a clear strategy with sets of objectives that is being scrupulously followed and results closely evaluated to ensure their alignment with global objective.

➢ Results acceptability

Quality of results remains a prime goal to the team. This is clearly demonstrated by various implementation strategies adopted. As an example, project team has put in place a working group formed with two teachers of each grade in order to supervise the software development. Moreover, tests results are closely analysed to identify bugs and errors.

2.7.3. EFFICIENCY OF PLANNING AND IMPLEMENTATION

➢ Percentage of achieved project plan

Based on final report, we could ascertain that the project is on target as planed. The application is ready for use and the team is currently focused on the development of a learning curriculum and bugs fixing.

➢ Expenses aligned with budget

There is an important cost variation to be noted. Though a sound explanation is provided for said variation, we would like to remind the team of the impact on overall project.

➢ Archive of collected data

As stated above, the strategy defined for the execution of the project encompasses evaluation of results. To achieve that, it is capital that data collected be properly archived. It is to be noted that project team has presented in this report, convincing evidences of data collection and archiving. In addition, an improved architecture with a centralized datacentre was developed and is expected to be implement in a subsequent phase of the project.

2.7.4. IMPACT

➢ General objectives and final goals achieved

We would like to point out that results alone are not sufficient to evaluate the impact of a project. However, it should be noted that the project objectives could be formulated as a first step in achieving overall objectives.

Based on final report, we can ascertain that tremendous efforts were deployed and great results were achieved. There remains few adjustments to make in order to increase the performance of the product but it is undeniable that general objectives and final goals were duly achieved.

> ➢ Long-term benefits contribution

This project definitely leads to a positive long-term impact. As stated in the project charter, a UNESCO report clearly highlights the advantages of mother tongue based education in early years. Coupled with technology, this learning initiative will enable children whether from rural or city areas as well as those suffering from dyslexia to be exposed, at an early stage, to educational applications and to the benefits of the Internet.

2.8. RECOMMENDATIONS

The quality of this final report clearly demonstrates the level of commitment and dedication of project team. A well-defined strategy and methodology was laid out and strictly followed. Control and evaluation steps have been defined to ensure project success and adjustments constantly made to ensure that final goals are achieved. A thorough assessment was performed and actions implemented to minimize identified risks.

We recommend that project team pay close attention to cost and scope variation so as to ensure complete success of implementation.