Title: IPods Improve Education in Rural Zambia

Theme: Formal Education, Technologies for Scaling up ODL Programmes.

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About 12.69 percent of the Zambian population have no access to formal education due to a number of factors such as poverty ,limited learning space etc.It is therefore imperative that government devises methods of education delivery that accerarates the provision of education services t the unreached population. As a result the ministry has taken advantage of the its educational broadcasting services in the communication sector through the delivery of educational programs using a variety of technology on the national, regional and international market.

In Zambia, teachers are using iPods to enhance teaching and learning in mathematics, science, and English especially for the interactive radio instruction (IRI) the IPods' are loaded with the lessons as well as with audio and video training materials designed to support teachers in their presentation of complex topics.

The iPods bring teachers enriched professional content right in their hands and classrooms, when they need it. This is highly relevant professional support. The iPods also help the IRI team in Zambia address another challenge: how to convey concepts that are more easily explained visually. You can teach people about a square with radio, for instance, but you can't show them how to cut and fold a cube. So a video of an educator demonstrating cutting and folding a cube to accompany the lesson on three-dimensional shapes. Now teachers can see it being done and practice it before asking students to do it.

Using the iPods in combination with a solar-powered generator and a set of speakers, the teachers can also broadcast the lessons without being tied to the radio schedule if they are to follow the regular live broadcast programmes. The iPod affords teachers more autonomy than the radio broadcasts. Teachers can decide when to teach the lesson; they can choose to repeat the lesson, to stop and rewind the lesson, or to review a part of the lesson.

The initiative isn't expensive. At $250 per iPod and another $250 for the generator, the cost presents a significant hurdle. But as technology costs decrease and access to electricity spreads in Zambia, the technology will quickly become more affordable.

In Zambia community schools teachers are often faced with complex and difficult teaching situations. Unpaid volunteers, these mostly untrained teachers often work beyond the reach of electricity or radio reception. While their academic levels may be adequate at the early primary levels, they are sometimes unprepared to teach the more complex concepts of mathematics, science and English at middle and upper basic levels. One of the Ministry of Education's more ambitious responses to this challenge is the Interactive Radio instruction (IRI) series of the Educational broadcasting Services. The Ministry of

Education broadcasts Grade 1-7 lessons on national radio, reaching many community schools and IRI centers.

In 2007 the Ministry of Education in Zambia began piloting the use of iPods in delivering education with a goal of extending access of the IRI lessons to communities unable to receive the daily radio signal. Video-capable IPods with the ability to play both MP3 and MP4 files were loaded with the 150 interactive Radio Instruction lessons covering the 6th grade Zambian curriculum.12 rural teachers in the directs of Kafue, Chongwe and Kalomo were trained in the use of these iPods to assure delivery of the daily lessons.

As many of the volunteer teachers did not complete their secondary education and have no formal training, another important goal of the first phase of the Initiative was to equip untrained rural teachers with an electronic teachers resource library of lesson –specific enrichment materials and practices activities created to corresponded to topic of the Grade 6 curriculum in the area of Mathematics, science and English. These resources, in text, audio and video formats, were prepared by the ministry of education. . Training sessions were held to familiarize teachers with the resources and how to use them in the preparation of lesson and post-broadcast activities.

In order to respond to the challenges of broadcasting live programmes on radio the ministry decided to use a system that was a combination of the following cost effective and uses friendly equipment IPods player, Speakers, Headphones, solar panel, Speakers, Headphones, 12 volt battery charged by a 14 volt solar panel, Headphones, a wind up solar driven radio with an iTrip.

The combination and connection of the isolated equipment has been found to be very easy to use and works as follows. The solar panel is put in the sun the whole day in order to store enough energy attached to it is the battery which is charged in turn. After the battery is charged then when time to charge the battery comes it is done by attaching the it to the battery with a “cigarette-lighter” plug and these charges the iPod. Charging the IPod is more favorable in the night when most almost all centers and community schools are not in session. By morning it can be removed from the battery switched on and is ready for use. To carry it to the learning center or community school the teacher or mentor put it in a special shatter, water and dust proof container.

The IPods are loaded with educational materials on each iPods are 150 grade 1 to 7, 30 minute programmes, 15 teacher training material 15 minute programmes song, song lyrics some reading materials and short experiments. These programmes are designed, developed and produced centrally by content experts at educational Broadcasting services. This conveys teachers enriched professional content right in their hands and classroom, when they need it. This also provides access to quality education to thousands of learners all over Zambia especially those that are orphaned, vulnerable and those who are in had to reach places geographically.

The achievements rates of learners and teachers using the iPod are compared with those of their peers in government schools. According to the assessments done in the community schools and IRI centres for the 5th grade the results indicated that the learners are not far below the levels of the learners in the government.

Below are the summaries of the results of the tests.

Grade 1 testing in 2007

The table below presents mean scores for learners who had good radio reception, who had good attendance (80 percent of the lessons or more), and were 7 year or older learners in the IRI centre and community schools using live radio broadcasts out performed the learners in IRI centres and community schools using the IPods programmes in English language while the learners in centres using that were using the iPod performed better in mathematics, science and literacy.

Table 1: Overall performance, by IRI centres and community schools that use IPods and those that use live radio broadcasts

Test	Scores	IRI Centres and Community schools using live radio broadcasts	IRI Centres and Community schools using IPods	Government School
Science	43	17.0	30.5	29.1
Numeracy		43.7	66.4	58.2
English	43	57.9	49.4	38.1

In 2008 tests were administered in IRI centres and community school using the IPods those that are did not the IPods or the Radio. The results showed that the IRI centres and community schools using the IPods significantly achieved higher scores than t did not uses the IPod while the scores obtained in the control centres was significantly low.

Table: Overall mean score, by IRI Centres and community schools using the IPods, live radio and those that do not use any of the two

Type of school		Maths (13 points)	Science (36 points)	Life Skills (8points)	English Language (29 Points)	Overall Test (86 Points)
Centres and Schools using IPods	Mean	7.1	7.6	3.5	10.2	28.5
	Percent	54.6	21.1	43.8	35.2	33.1
Control centres	Mean	5.7	8.0	3.6	8.1	25.4
	Percent	43.1	22.2	45.0	27.9	29.5
Centres and community Schools that do not use the IPod	Mean	6.7	5.9	4.5	7.4	24.6
	Percent	51.5	16.4	56.3	25.5	28.6

Grade 3 Testing in IRI Schools 2008

Grade 3 assessment consisted of four subtests: mathematics was worth 27, English 35, Science27 and Life skills 20 points. The next table presents the mean scores for the overall tests and for the subtest for all learners in centres and community schools as well as those in the control centres (48.9percent compared to 42.9 percent).Learners in IRI centre and community schools using IPods performed better

than learners in the Community Schools not using. In mathematics, English and social Studies. In science, the performance of learners using the IPods and those not using iPods or live radio was at par (a mean of 65.6percent for each group) the difference between the means were significant =.05

Mean scores for all learners by school type and subtest

School type		Maths 27 points	English 35 points	Science 27 points	Social Studies 20 Points	Overall 109 Points
Community schools and IRI centers using IPods	Mean	10	11.5	17.7	13.6	53.3
	Percentage	38	32.9	65.6	68.0	48.9
Community Schools and IRI centers not using IPods	Mean	7.6	8.9	17.7	12.5	46.8
	Percentage	28.1	25.4	65.6	62.6	42.9

Although the test was in a few centres and community schools the results indicated that the learner's using IPods' to access education is not for low the levels of learners in regular government schools. As shown in the table below.

Skill	GRZ SCHOOL	IRI CENTRES AND COMMUNITY SCHOOLS USING IPODS
Reading in English	34.49%	32.3%
Numeracy	38.45%	38.35%
Zambian Languages	37.79%	33.35%

Achievement tests have been conducted each year since the programme started and has indicated that the community schools using IRI, although under-resourced and with untrained teachers, achieve nearly the same results as government basic. Using the IPods has made a significant difference in the scores achieved with those schools which did not use the IPod system.

Early results show that the teachers are very satisfied with the IPods as a means of delivering Interactive Radio Instructions lessons to their learners and they have identified the following benefits:

- Increase flexibility in choosing when to conduct the lesson, rather than being bound to a broadcast schedule.
- More efficient teaching in that, by using the pause and replay controls, the teacher is able to give more time for a specific activities or to replay a segment of the broadcast that was not understood
- More regular attendance at school, which they attribute of both the novelty of the IPod as a means of instruction and the independence from radio broadcast in areas with poor reception.

In response to the studies that showed that pupils in community and IRI centre's are usually poor readers, the Ministry of Education has made a number of modifications to the original design of the second phase of the iPod pilot

This was by uploading all the IRI lessons for Grade 1-3 on to the IPod players that can be shared among teachers at those levels at a school, the target audience were changed from upper to lower grades and from single class room to several. This increased the access to education through IRI for learners in the schools.

The Ministry of Education also equipped the schools with small transmitters called Itrips that allow the uses of FM waves to broadcast from the IPods on to the wind up radio which had already been distributed in the majority of community schools in the country eliminating the need for external speakers. It has also prepared an electronic library of supplementary teaching and learning resources specifically targeting the teaching of reading and writing at early levels. These resources were loaded on the IPod players and allowed teacher access to specific strategy that should have a positive effect on their pupils; learning of early literacy skills. This also encouraged collaboration among colleagues in the school not only in the sharing of the equipment, but also in the production and used of teaching resources. Teachers were able to debrief their experiences, adjust as necessary and experiment with new ways of adapting the resources to their own particular environment.

Self reports by teachers reflect journals and monitoring report helped document the successes and challenges of the initiative. Districts and Zonal officers were included in the ministering of IRI pods sites as part of their regular duties. As a means of increased understanding of the teaching and learning process and improving teaching practices, all participants were encouraged to adapt the habit of regular professional journal keeping. This ensured regular record keeping concerning experiences and growth as teachers and the effects on learning and teaching that were bought about by the use of teaching resources.

The ministry of Education has a structure in place that looks at Open and Distance Learning (ODL) at all levels starting from the nation, province, district, and zone levels. This structure is very cardinal in the sustainability strategy that the ministry of education has put in place in terms of the following very cardinal issues.

The training plan for this programme is done in a way that at every stage the national training team trained the provincial team and they then trained the district team the district team comprised of the district resource centre coordinators from all the districts concerned and School Zonal Coordinators and mentors. This meant that training could happen in the places were the centers and community schools are located .Each district resource centre was given a full set of the IPod system and they could be retrained by the district resource center coordinator at any time if they wanted and this also works as a back up type training system incase a mentor resigned and there was need to immediately replace the mentor with a new one.

There are a lot of sustainably issues that have been put in place firstly the community centers and schools are community initiated after which when the ministry finds out the there is that need then the ministry organizes trainings at local level for the mentor and all the stake holders in the community.

The other thing is that because the iPod uses solar and it is abundant and free there are very negligible costs that the community will spend money on the maintenance of the system. In issues of maintenance and break downs the ministry has not received any breakdown so far on the actual iPods but there have been reports on the battery breaking down. The cause was found out to be the exposure to the sun so now the teachers have been advised not to expose the battery in the sun openly. Places were the battery was not exposes to the sun open

The ministry of Education implemented the initiative by providing MP3 players in 46 schools in Chongwe, Kalomo, Mpika and Mukushi districts. In January 2009, the ministry of education working with an NGO called QUESTT provided a further 210 MP3 players to some community schools and Districts resource centres. Although the demand is high,210 IPods players is a small number that cannot be distributed to all needy schools in all the 9 provinces. However in August 2008,districs zones and schools were selected for the uses of IPods.

The selection of districts, zones and schools that to be given IPods is provided by Provincial Senior Education officers. In order to achieve goods monitoring and evaluation results, selection was based on clustering the schools using the IPod technology for teaching and learning. Secondly, consideration was given to roll out all zones in districts that were already implementing the use of IPods. In addition, districts for implementing use of IPods were also considered. For example it would be more cost effective to travel and monitor the use of 10Ipods than travelling to monitor 5 IPod player usages.

Various advantages have been found for using the iPods some of which are that it allows the teacher to control the broadcast of the lessons to conform to the needs of the class *Pause, Repeat* unlike live broadcast using an IPods allows the teacher to have a lot of freedom and control over the uses of the programme such as being able to rewind and repeat activities being flexible in the choice of tine to play the programme, being able to pause or play forward any information that they would want to do again.

Allows for more complete preparation of lessons

The teacher and learners are able to complete check and properly prepare for the lesson that is going to come; the IPod also gives the Community teachers and mentors ample time to choose the activities and materials to use during the lesson.

Flexible

The use of iPod gives the learners and teachers freedom to do things in the use of the programmes. They have choice on when to use the programme when they and what they can learn without limitations like the ones the live radio broadcast has.

Simple to operate

The IPods are very easy to use. The way to use the IPod is done in a demonstration that is done to the users in a shot training. This short demonstration of how to use the iPod is in Video. This allows the uses to straight away start operating the equipment with out any problems.

However the use of the IPod has come with its own challenges some of them being

The retention of trained mentors has been one big problem in the initiative this has been attributed to the fact that they are supported by the communities and most of the communities using the IPods are in such communities so they stop teaching.

The other thing is that especially with is working with partner organization some of which are able to provide some of the needs the basic need of the mentors and teachers. The other thing is that they have now started putting music on the IPods. This has been solved by removing the cables that would allow them download music in the kit provided to them.