Impact case study:

Mpelembe basic schools partnership

[IICD, December 2015]

Date	December 2015
Version	Final
Owner	David Hollow
Phone	0208 960 7067
Email	d.hollow@jigsawconsult.com

Contents

Executive summary

This evaluative case study documents the experiences of the 'Mpelembe basic schools partnership', an initiative supported by IICD and Edukans that uses the expertise and resources of Mpelembe school to build the capacity of the partner schools in the effective use of ICT. Each participating school has been provided with a range of technology and associated training. The theory of change for the programme is that if teacher capacity to use ICT can be improved, and the school management and administration through ICT can be improved, then student learning outcomes will improve and their participation in school will increase. Therefore, the objective of the exercise is to understand, demonstrate and capture the impact that the introduction and use of ICT is having in the programme schools in regard to teacher capacity to make effective use of ICT in effective teaching, school management and administration capacity to make effective use of ICT, and student learning outcomes.

The primary research for the study was undertaken during two field visits to Kitwe, Zambia, the first in November 2013 and the second in March 2015. The methods employed for the research included participatory observation, assessment of schools records, interviews with teachers, heads and administrators, focus groups with teachers, and pre-post testing. The analysis examines the way in which the programme has had an impact in the following areas: the impact on teachers, the impact on head teachers and school administration, and the impact on students. The focus on these three areas enables an overall assessment of the programme theory of change.

The teachers who have started to use ICT have reported increased confidence, mixed results in usage patterns, and a range of different benefits and challenges. The interviews with the teachers corroborated the reported increase in confidence, but also highlighted the on-going challenges and the recognised need for on-going progress.

The research demonstrated four major benefits for teachers in using ICT for lesson preparation and delivery: access to information, more interesting lessons, more differentiated lessons, and more detailed lessons. There has been a significant change from the beginning of the project in relation to use of PowerPoint, Word and the internet. The use of all three technologies to assist teachers in their work has increased steadily throughout the life of the programme. However, the interviews demonstrated mixed responses regarding the detail of the way in which the technology was being used by the teachers, with specific challenges relating to using the internet.

It is widely recognized by the head teachers that ICT has the potential to have a significant positive impact on the way in which schools are administrated. However, the level to which they have actually adopted ICT for school administration is varied across the schools. There are encouraging examples of head teachers taking initiative to help their teachers use technology more for administrative as well as teaching purposes.

The ability to bring pupils into a computer lab for a lesson has had some positive effect on student learning. It was noted anecdotally that the introduction of the computer room has had a positive impact on student engagement and contributed to a positive effect on examination results. However, there is an ongoing challenge in the programme schools of limited access to the computer labs for the students that wish to engage.

It is not yet possible to attribute any quantifiable change in school performance to the input of the ICT. However, there are numerous anecdotal accounts from head teachers regarding the way in which the programme has improved learning outcomes for students because of the motivational factor provided by the technology. It is likely that the introduction of ICT as a compulsory subject for examination at the end of G9 will have major consequences for the programme, in relation to the way ICT is perceived and the level of interest and motivation in the partnership from the participating schools: ICT is moving from the periphery to the core of the curriculum.

The partnership has made significant progress and contributed to educational change in the participating schools. The inputs provided have begun to increase teacher capacity to make effective use of ICT and head teacher capacity to undertake effective school management. A foundation has been laid that can now be built upon. For the programme to have a significant impact on learning outcomes across all subjects it would require a more concentrated input of resources both human and technical, and may still be limited because of the wider educational challenges in the region. It is an ongoing challenge across the participating schools to move ICT from being an interesting addition to being a fully embedded aspect of the education system.

The case study closes by recommending either focusing future engagement on basic training in a large number of schools with poor attainment, or more sustained and in-depth engagement with a small number of schools. In addition are a suite of recommendations including those listed below. Firstly, invest intensive resources in building the capacity of Mpelembe to continue to lead the partnership effectively into the future. Secondly, prioritise on-going, in-depth training so that the teachers become confident and are incentivized to continue using the ICT. Thirdly, consider supporting the on-going costs of internet connectivity and electricity so that the teachers can access online learning resources and further develop the potential for using ICT for effective school management.

1. Introduction

1.1. Overview

The 'Mpelembe basic schools partnership' is an initiative supported by IICD and Edukans that uses the expertise and resources of Mpelembe school in Zambia to build the capacity of the partner schools in the effective use of ICT. The partnership is part of the wider Connect4Change (C4C) programme which has been set up to run from 2011 – June 2015. The C4C consists of a consortium of IICD, Edukans, Cordaid, ICCO, AKVO and TTC and is led by IICD. The C4C programme supports activities in the education, health and economic development sectors in 11 countries: Bolivia, Burkina Faso, Ethiopia, Ghana, Kenya, Mali, Malawi, Peru, Tanzania, Uganda and Zambia. The C4C mission is to strengthen people and civil society organisations in the sustainable use of and lobby for ICT to achieve their development goals. Edukans and IICD are the partners within C4C for the education sector.

1.2. Programme context

The Mpelembe basic schools partnership includes the following schools: Mpelembe, Rokana, Riverain, Matete, Kamfinsa (Parklands school was also added to the partnership after it had started). All of the schools are in or near to Kitwe, in the copper-belt of Zambia. The partnership is led by Mpelembe, a well-respected, well-resourced secondary school in Kitwe. The current programme coordinator for the Mpelembe basic schools partnership is Mr Simpande and the former programme coordinator is Mr Gonzalo Portal. IICD has played a central role in establishing and building the partnership and has provided each participating school with the following:

- A computer lab with 10 computers
- A computer for the head teacher
- A projector for each school
- Training and support from the programme coordinators
- Various additional support, training, workshops, and educational software

1.3. Rationale for the impact study

The appropriate use of ICT has the potential to improve education in a wide range of ways in low resource environments. However, designing and implementing interventions in a way that makes the benefits likely to occur is a significant challenge. Many programmes introduce technology but do not see the anticipated improvement in education. The Mpelembe basic schools partnership was designed with this understanding in mind.

Across the ICT for education sector effective impact assessment is a well-recognized and documented challenge. It is clear that effective understanding of impact cannot be undertaken in isolation and in order to lead to genuine learning it should be built into the fabric of ICT for education programmes from the outset. For this reason, IICD requested that Jigsaw Consult undertake a continuous study throughout the programme life-cycle. The purpose is that IICD can gain an in-depth understanding of the effectiveness of its work, and at the same time can make a

valuable contribution to the learning of the wider sector.

An impact study of this nature is not fully detached from the implementation process. In a context like this there is little value in holding back insights until the programme has finished and all operational decisions have already been made. Instead, the Jigsaw research team have shared their observations and suggestions with the programme team throughout in the form of conversations, workshops and interim reports. This case study is one important component – but not the sum total.

1.4. How to use the case study

This impact case study documents the findings from a two year study regarding the Mpelembe basic schools partnership. It is best read in conjunction with associated reports which add detail and explore particular aspects in greater depth:

- Impact case study on Savana Signatures (C4C Ghana)
- Road-map for impact
- Lessons learned

1.5. Structure of the case study

The case study begins by explaining the objectives of the programme and the methodology used in conducting the evaluation. The analysis is split into distinct areas of impact: impact of ICT on teachers, impact of ICT on head teachers and school administration, and impact of ICT on students. The case study then ends with conclusions and recommendations for the future.

2.   Objective

The objective of the impact study is to understand, demonstrate and capture the effect that the introduction and use of ICT is having in the participating schools in regard to:

1. Teacher capacity to make effective use of ICT in effective teaching
    - Ability to identify and use offline digital content (use of computers, Excel etc)
    - Ability to design lesson plans and deliver lessons using ICT
    - Attitude towards and application of children 'centred' approaches
2. School management and administration capacity to make effective use of ICT
    - Administrative effectiveness (accuracy of data, tracing of student results, transparency, report writing)
    - Administrative efficiency (time and money required)
    - Change in mind-set regarding school management
3. Student learning outcomes (participation and attainment)
    - Achievements in test scores (national curriculum exam scores)
    - Student participation (drop-outs will decrease)
    - Student worldview and aspirations (including critical thinking, assumed future)

In particular, the intention is to understand whether a positive effect in the first and second areas will lead to a positive effect in the third area (student learning outcomes). The Theory of Change for the programme is that if teacher capacity to use ICT can be improved, and the school management and administration through ICT can be improved, then student learning outcomes will improve and their participation in school will increase.

(It should be noted that the Theory of Change was finalised following the initial implementation of the programme.)

3.   Methodology

3.1.   Overview of research activities

The primary research for the impact study was conducted during two field visits, the first in November 2013 and the second in March 2015. Each visit was hosted very effectively by Mpelembe. The table below summarizes the research activities completed.

	Visit 1 (Nov 2013)	Visit 2 (Mar 2015)	Total
School visit	5 visits	5 visits	**10 visits**
Interview with teachers	30 interviews	26 interviews	**56 interviews**
Survey with teachers	30 surveys	26 surveys	**56 surveys**
Interview with heads	5 interviews	5 interviews	**10 interviews**
Interview with other stakeholders	9 interviews	12 interviews	**21 interviews**
Lesson observation sessions	3 lessons	1 lesson	**4 lessons**
Direct assessment of school records	5 schools	5 schools	**10 schools**

Each school visit lasted for between two and four hours. The visits were undertaken by the two researchers, accompanied by the programme coordinator. All of the interviews adopted a semi-structured approach to ensure consistency while also allowing for flexible exploration of particular themes that were important to the interviewees in different contexts. All of the prospective interviewees were given the choice of whether or not they interacted with the research team. Alongside the teacher interviews a survey was also conducted to map the progression of the

teacher perspective, confidence and usage of the technology throughout the programme using a three stage ranking exercise (pre-programme, at November 2013, and at March 2015). The ranking questions can be viewed in Appendix 2. The 'other stakeholders' included programme staff, officials from the MoE, and influential figures within the local community. On both visits each school was notified in advance that the research team would be visiting and all protocols were observed.

3.2. Methodological details

It is important to note at the outset five specific issues encountered in undertaking the impact study.

Firstly, the research team did not have the authority to compel all participating teachers to be interviewed. It became apparent during the research visits that there were some teachers not willing to be interviewed. The research team were informed (by other teachers) that those that refused to be interviewed were those no longer engaging with the use of ICT after the training. It is therefore likely that the results provide a slightly more positive picture than if all teachers had been interviewed. A specific example of this is in the interpretation of the 'confidence in ICT usage' data. This is a reliable measure for the change in confidence for those teachers that agreed to be interviewed. It should not be seen as an indicative measure of the change in confidence of all the teachers participating in the programme across all schools.

Secondly, it was not possible to collect reliable historical data regarding examination results in a way that could be analysed reliably across the schools. Despite significant time investment and manually collecting data from the participating schools, there was not sufficient quality of uniform data to allow for meaningful quantitative analysis of examination results across schools. This was further exacerbated by the difficulty of accessing suitable control schools. This proved to not be possible without the permission of the MoE. (It should also be noted that this was possible in the Ghana impact study and so that report benefits from the quantitative data.)

Thirdly, there is significant difference in level of ICT usage between Mpelembe and the other schools in the partnership. This is largely due to factors external to the partnership, namely that Mpelembe is a very well-resourced school in all respects in comparison with the other schools in the partnership. It is also due to the face Mpelembe has received support from IICD since 2007 and was designated as a 'champion school' from which others could learn and develop. This means that the comments from Mpelembe should not be understood as being indicative of the whole partnership. A simple example from the research illustrates the difference between the schools. The current programme coordinator, Mr Simpande, estimated that, of the 49 teachers working in Mpelembe, approximately 29 are now using ICT regularly in their work. In contrast, in the least engaged school in the partnership, it was reported that only two or three of the teachers are now using ICT regularly in their work.

Fourthly, the Mpelembe partnership was founded on the notion of basic schools (primary and junior secondary) but basic schools are currently being phased out following a directive from the MoE and replaced with schools that are either primary or secondary. The MoE started to implement the changes in 2014 and these will continue gradually. This means that some

participating schools are no longer strictly basic schools (one example of this is Matete).

Fifthly, within the programme schools there are multiple inputs related to ICT and this makes attribution analysis a complex process. This is particularly pronounced in Mpelembe as a higher resource school. The partnership formed because of the role of IICD and C4C more broadly, but there are now multiple inputs (Mpelembe itself, Computers for Zambian Schools, CAMARA etc) contributing to the positive impact that is taking place. This means that it is not sensible to try and demonstrate the singular causal impact that IICD and Edukans have had in the schools. More appropriate is focusing on the vital contributing role that IICD and Edukans have played as the initial catalyst and the on-going significant role that the organisations hold within the system.

4. Analysis

4.1. Overview

The analysis examines the impact that the programme has had in the following areas:

- The impact on teachers (lesson preparation and delivery)
- The impact on head teachers and school administration
- The impact on students

The focus on these three areas enables an overall assessment of the programme theory of change as outlined in the objectives.

4.2. Impact on teachers (lesson preparation and delivery)

This section analyses the impact on teachers of using ICT for preparing and delivering their lessons. The teachers who have started to use ICT have reported increased confidence, mixed results in usage patterns, and a range of different benefits and challenges.

Increased confidence in ICT

The teacher surveys conducted in November 2013 and February 2015 indicate a significant positive impact in teacher confidence in use of ICT. The example in the table below demonstrates the change in confidence in regard to preparing documents on the computer and delivering lessons using ICT. 93% said they had no confidence in using the computer to write a document before the training. At November 2013 93% said they felt very confident, and in February 2015 70% still said that they felt very confident. It is not unusual in educational change programmes for confidence to increase dramatically in the first year of implementation and then decrease in year two. This is because, as participants actually start to use the ICT, they realise that they do not know as much as they first anticipated following the training. So as their competence increases, so their confidence reduces slightly because they adopt a more realistic assessment of their own abilities. In light of this, it is somewhat encouraging that as many as 70% reported being very confident after two years of the programme operating.

The interviews with the teachers corroborated the reported increase in confidence, but also highlighted the on-going challenges. Although teachers state that they are very confident, they also recognize that there is more progress that they could make. A female teacher at Mpelembe echoed the sentiment of many teachers and confirmed that for her, ICT usage is ' all about confidence' and she considered it was an on-going lack of confidence that limits the use of ICT in lesson preparation and delivery for teachers in her school. Anecdotal feedback suggests that at the heart of the lack of confidence is uncertainty from teachers regarding how to actually integrate the use of technology into the day to day rhythm of the lessons. This demonstrates the need for on-going, in-school support helping teachers to gradually adapt their pedagogical approaches.

Question	Response	Pre-training	At Nov 2013	At Feb 2015
How confident do you feel in your ability to use the computers to write a document?	No confidence	93%	0%	0%
	A little confidence	0%	7%	4%
	Some confidence	0%	0%	13%
	Good confidence	7%	0%	13%
	Very good confidence	0%	93%	70%
How confident do you feel in your ability to use ICT to deliver lessons that are interesting to the students / of better quality?	No confidence	100%	7%	0%
	A little confidence	0%	0%	4%
	Some confidence	0%	14%	17%
	Good confidence	0%	0%	13%
	Very good confidence	0%	79%	66%

Teacher usage of ICT

The main ways in which teachers are using ICT during their lesson delivery is with PowerPoint, printed handouts, and through use of the computer room in each school. As demonstrated in the table below there has been a significant change from the beginning of the project in relation to use of PowerPoint, Word and the internet. The use of all three technologies to assist teachers in their work has increased steadily throughout the life of the programme. In regard to PowerPoint, prior to the programme 93% of teachers were never using it and 7% were using it occasionally. At February 2015, only 13% were never using it, and 26% were using it on a daily basis. The increasing use of Word has followed a similar trajectory. Prior to the training 86% were never using it and none were using it daily. At February 2015 only 4% are never using it and 44% are using it daily. The internet was used by 7% on a daily basis before the programme, with 86% never using it. At February 2015 only 9% are never using it and 39% use it each day.

However, as documented in the challenges section, the interviews demonstrated mixed responses regarding the detail of the way in which the technology was being used by the teachers. There are

specific challenges in relation to the internet. Many teachers reported that the connection they have in school is regularly not working because of the high monthly charges. 39% of respondents use the internet every day in their work as a teacher – but for most of them this involves resorting to using connections outside of school (and therefore not directly linked to the programme) because of the lack of consistency from the in-school connections.

Question	Response	Pre-training	At Nov 2013	At Feb 2015
How often do you use PowerPoint to help you in your work as a teacher?	Never	93%	14%	13%
	Occasionally	7%	44%	17%
	Sometimes	0%	28%	22%
	Regularly	0%	14%	22%
	Daily	0%	0%	26%
How often do you use Word for to help you in your work as a teacher?	Never	86%	7%	4%
	Occasionally	0%	21%	4%
	Sometimes	0%	14%	13%
	Regularly	14%	28%	35%
	Daily	0%	28%	44%
How often do you use internet to help you in your work as a teacher?	Never	86%	21%	9%
	Occasionally	0%	14%	13%
	Sometimes	7%	21%	22%
	Regularly	0%	21%	17%
	Daily	7%	21%	39%

Major benefits for teachers

The interviews demonstrated four major benefits for teachers in using ICT for lesson preparation and delivery: access to information, more interesting lessons, more differentiated lessons, and more detailed lessons.

Access to information

The ability to easily access more information was mentioned as a significant benefit by several teachers across different subjects and different schools. The access to information enables the teachers to integrate more varied content in their lessons. A male Maths teacher at Kamfinsa explained: 'use of technology has broadened my horizons and thinking because I now I do not just

stick to the information in the book but I also look at other authors'. Linked to this, several teachers noted that, when they had connectivity, the presence of the internet helped them conduct research for lessons. A female science teacher from Rokana explained that she found it easy to find information on the internet and that she preferred this 'instead of you carrying or looking for books that are hard to find'. Improved access to information through ICT also means it is easier for teachers to keep up-to-date with news and new information that make the lessons more dynamic and relevant. A female sports teacher at Mpelembe explained this change:

> *'I monitor the Amateur Athletics Statistics for my sports students. Now you can see the statistics immediately whereas before it would take a long time for news to reach us - so this motivates the students. Also, the international sports calendar is a benefit - right now I am the coach the basketball team and I can tell them when the NBA is starting - I know what is happening at the moment.'*

Linked to this, teachers noted how the improved access to information helped them to develop their skills and knowledge more broadly. This was illustrated by a female teacher at Mpelembe who explained how she enjoyed the fact she can 'keep improving instead of relying on the information that you received at university five years ago'.

Interesting lessons

Teachers in the interviews reported that their use of ICT enabled them to provide lessons that were of more interest to the students. Across the partner schools, it was noted that the presence of the ICT in lesson delivery has resulted in an improvement in attention and interest in their lessons as well as reducing absenteeism. A male English teacher at Riverain reported that his use of PowerPoint and handouts has 'improved the attention span of the students because they are motivated and are more hands-on … it has reduced absenteeism.' A female Home Economics and English teacher at Riverain also affirmed that 'the children have challenges from their home so they need to be motivated in terms of learning so this will help because they are learning something which is interesting'.

Differentiated lessons

Some teachers using ICT expressed that the technology allows them to be more visual, clearer and able to differentiate their lessons for different levels of student ability. They reported that this in turn increases retention and understanding among students. It also enables faster and slower learners to learn at their own pace. A male Maths teacher from Kamfinsa explained how it helps slower learners to engage more easily because 'if you wipe the board they miss out – but if they miss out when I use PowerPoint, you can just can go back to the previous slide.' Several teachers mentioned that they believe their students understand information more quickly when it is conveyed through PowerPoint. For example, a female teacher at Matete noted 'they grasp the information faster if I use PowerPoint, they grasp things faster than if I draw on the board and just do a sketch'.

Detailed lessons

Teachers report being able to convey more information than before within a single lesson which is

making their work easier. A male teacher at Riverain noted that before the ICT was in place 'you had to write on the board and you could not write so much, so (the ability to prepare and distribute) handouts makes a big difference'. A female Maths teacher from Mpelembe also confirmed that she found Power Point easier and faster than drawing diagrams by hand.

Major challenges for teachers

The full integration of the ICT as a tool for lesson preparation and delivery is relatively limited in all subjects apart from ICT. The teachers reported challenges due to a lack of resources, limited time to use the technology, and a mixed response to engaging in training.

Lack of resources

The lack of adequate access to a projector was a common theme amongst all schools. Although each school was provided with a projector, teachers reported that they struggled to access it when they needed it. This meant that they were less motivated to use PowerPoint and less able to practice. A female History teacher from Rokana reported: 'when we go for the training they teach us about PowerPoint – but then when we come back to the school, the facilities to use it are not there - practice makes perfect but the resources are not available'. A male Maths teacher at Kamfinsa similarly noted that using PowerPoint sometimes resulted in wasted time: 'it takes 10 min to connect and then you only have 30 minutes or when there is no power I am stranded'.

The difficulty of learning to using PowerPoint and then applying it with confidence in the classroom has prevented many teachers from adopting it in their day to day work. A male English teacher at Kamfinsa explained that: 'I was a bit slow in grasping using the PowerPoint, maybe at some point I will use PowerPoint but not yet'. Again, multiple interviewees expressed that their lack of confidence is the most significant factor that prevents them from using PowerPoint – which stems from the lack of practical access. This is particularly relevant as teachers feel the pressure of being potentially embarrassed by their students. A male ICT Teacher at Mpelembe said that some teachers struggle because 'the teacher needs to learn the programmes and then teach it - the pupil might know the programmes and you don't, even though you are meant to (be the teacher)'. Linked to this, a perceived inability to correct information if it is wrong has made several head teachers reluctant to encourage the use of PowerPoint. The head teacher at Mpelembe explained that, for him, the main drawback of making extensive use of PowerPoint in the classroom is that children may learn wrong information as teachers are unable to edit the slides during lessons.

Limited time

Numerous teachers reported a lack of time to actually make use of the technology in their lesson preparation. A female french and history teacher at Mpelembe reported that her reason for not making significant use of the computer is because there is inadequate time: 'if there was a bank of lessons on the computer it would be easier but just stating a lesson from scratch, it takes time'. A female maths teacher at Mpelembe also explained the challenge of finding the time to practice: 'for me in this school, it is the time to sit at the computer and practice – that is the biggest challenge - I am always busy doing this and that'. Similarly, the head teacher at Rokana reported how her teachers feel that ICT 'is adding to their burden'. She expressed her hope that the

teachers will realise that eventually ICT can reduce that burden and help them prepare faster, but she noted that as in any change process, 'the initial part that we are in now is always difficult for the teachers'.

<u>Mixed response to training</u>

Across the participating schools there is widespread appreciation for the training that has been provided. There was a strong request for additional on-going training on specific topics to follow the introductory training already provided (such as training on online safety). In relation to training, the importance of IICD was highlighted repeatedly. The former head teacher of Mpelembe noted ' the equipment that is donated is not as important as the training that is given … even though some schools want equipment without training, when this happens in the end they don't actually use it'.

However across the partnership, with the exception of Mpelembe, there is still a struggle to truly embed the use of ICT among teaching staff in regard to lesson preparation and delivery. There are a wide range of factors contributing to this situation and one of these is the limited effectiveness of the cascade training model. Training only a few teachers in ICT per school (selected by the head teacher) means that the untrained teachers are reliant on ICT teachers or trained teachers for help. The head teacher at Kamfinsa reported:

> 'It would have been better if there had been more training because at the moment when the ICT teacher is not there they (the teachers) cannot use it so much – there are only three teachers who are really conversant with the programme'.

An English teacher at Rokana confirmed this, explaining:

> 'I think that the reason that the ICT is not being used a lot … is because only two teachers went to the training course on how to use it and they were supposed to train the other teachers, but they did not. So the other teachers say that they do not know how to use them. Teachers are enthusiastic for technology but they are not confident'.

It appears that the majority of the teachers trained in ICT do not yet have the time, expertise or motivation necessary to help get their fellow teachers to a standard where they are also confident in using ICT. This means that the programme is in many ways dependent on the untrained teachers taking initiative and asking for help and trying out the technology for themselves. As a result, many of them gradually stop using the ICT when they encounter a problem they do not know how to overcome. As experienced in similar ICT in education initiatives, it takes longer than anticipated to train teachers to make full use of ICT and requires on-going support if the usage is to be sustained. The head teacher at Rokana also indicated that more training is needed because 'traditional teaching methods still dominate. It will take a long time for us to transition. The full integration of ICT in teaching and learning is something that we need to work on continually.'

Despite the request for more training previously noted, it was also apparent that this desire was not universal. Some teachers expressed that they did not want to learn a new skill. A female teacher at Matete said that 'most of the teachers have not shown interest in ICT; they want to

leave after school, not work on typing after school'. Her assessment was that less than 25% of the teachers were actually making use of ICT in an on-going way. A female sports teacher at Mpelembe noted that this is because 'we teachers tend to keep ourselves to doing things we already know'. As would be anticipated, several interviewees reported that the lack of interest in learning about ICT is particularly common among the older generation of teachers. There was no clear difference in the way female and male teachers responded to the training and adopted the ICT.

Interviewees at Mpelembe repeatedly noted a different challenge that is significantly felt in the school: the high rate of staff turnover. As expressed by the former head teacher:

> *'The young teachers, you hope they will carry the vision, you train them, they flower, they leave. This keeps continuing with ICT. We will keep having a big challenge with this until the older teachers who are stable in the school also become willing to use the ICT … if you are training the same stable group then it is ok – but with the new teachers coming in all the time training them in ICT is very hard work'.*

It is reported anecdotally that many teachers leave to work in other schools once they are trained in ICT. As demonstrated in the question above, Mpelembe senior staff rationalised this by explaining that although it meant their school does not always benefit directly from the training the young teacher are given, the programme is contributing to developing the ICT skills of teachers in the nation overall. However, more problematic is the other trend identified by interviewees that, once a teacher is trained in ICT, they can go and earn '10 times the salary' by working in the local mining industry using the ICT skills they have gained as a teacher.

4.3. Impact of ICT on head teachers and school administration

This section analyses the benefits and challenges of integrating ICT into school management and how head teachers have perceived the changes. It is widely recognized by the head teachers that ICT has the potential to have a significant positive impact on the way in which schools are administrated. However, the level to which they have actually adopted ICT for school administration is varied across the schools.

It is recognized by the head teachers that effective use of ICT provides the potential for work to be simplified, especially in undertaking data collection and storage. The head teacher at Matete reported that since using the computer for data collection, 'it has made it easy for us to do the work'. Similarly a teacher at Parklands reported that the school has successfully been able to use ICT to keep 'a record of all the students and their exam entry, and to send circular letters to parents and type reports'. The head teacher of Riverain reported:

> *'We are keeping a lot of files on the computer now – we could not do without it. We keep everything stored: the assessments, the teacher work plans, the staff details, and the student attendance, everything that the DEBs office wants us to send … having the computer is saving me a lot of time - before I had to write it in pen, and then get it typed, but now I can do it myself, and can just update everything'.*

There are also examples of head teachers taking initiative to help their teachers use technology more for administrative as well as teaching purposes. For example, the head teacher at Kamfinsa reported that in order to encourage more widespread usage she now refuses work from her teachers unless it is typed.

Mpelembe is operating at a significantly more advanced level than the other schools in the partnership in terms of its usage of ICT to manage the administrative functions of the school. The school is currently deploying a school management information system (SMIS) for the collation of exam results and other functions. It is anticipated by the school management that this will significantly reduce paperwork and save time and money. Mpelembe is exploring the possibility of customizing the system (Eduroam) for their own context and bespoke needs.

All the head teachers expressed their perspective that the programme would benefit from the introduction of an appropriate SMIS. They also expressed some frustration at the perceived slow pace of progress in this regard. The head teacher at Rokana said that in relation to using ICT for school administration 'nothing has changed so far … we are still in the position we were in during your last visit.' He noted the importance of an SMIS in Zambia being contextualized – able to work without a constant internet connection, and accessible for users with a low level of ICT literacy. He went on a one week training course in Lusaka in how to use Moodle but felt that one week was not sufficient time to grasp the concepts because 'it requires a lot of practice'.

A major challenge in ensuring ICT gets integrated into school administration in the partnership schools has been the attrition rate of head teachers throughout the lifecycle of the programme. The partnership was founded on the connection between the head teachers of the participating schools that were in place at the outset. However, the head teachers in several schools have been reallocated to new schools by the Ministry of Education: the head teachers of Riverrain, Rokana, Matete and Parklands all changed since the partnership started. The former head teacher of Mpelembe noted the significant difficulties of building a functional partnership under these conditions:

> 'How can a programme work if the MoE keeps moving head teachers around … it isn't possible to build something - it takes 1 to 2 years to build the relationships for the programme – and then they are moved and you are back to the beginning'.

4.4. Impact of ICT on students

Usage of ICT facilities by students

The ability to bring pupils into a computer lab for a lesson has had some positive effect on student learning. The head teacher at Riverain noted that the introduction of the computer room has had a positive impact on student engagement and contributed to a positive effect on examination results:

> 'When you see them walk in to the computer room you can see that they are interested. The child that is learning ICT has a different perspective on education as a whole. When you are exposed to the modern ways of learning and getting

information from a computer and getting information for yourself that matches
what the teachers are saying in the class – it really boosts the morale of the
learners in a great way'.

Several teachers noted their perspective that, even if the computer lab is not used to its fullest potential, any exposure to technology helps to prepare the students for the future. Several teachers mentioned that an increase in use of technology was a great way to prepare the children for the future, in particular university. A female teacher at Matete found ICT to be helpful for the students because 'they (the students) need that exposure now so that they can easily do things at the university level'. The head teacher at Kamfinsa confirmed that parents also appreciate ICT for this reason:

'Just two weeks ago we had a parent coming here who said that they wanted
their child to come here rather than to the new school because it is not the
exterior that is important, it is the access to the computers. There is a positive
outlook from the parents'.

However, there is an ongoing challenge in the programme schools of limited capacity for those students who wish to learn on computers in the computer labs. All schools apart from Mpelembe mentioned how the number of available computers was a limiting factor. Their average class size is 50-60 pupils but the computer room holds only 10-20 computers. As noted by a business studies teacher at Parklands, this results in a situation in a lesson where 'three or four children are sharing a computer and this is difficult'. The ICT teacher at Kamfinsa reported that he has resorted to dividing his lesson into two with half of the class waiting outside because they do not physically fit into the space available.

As mentioned previously, there are multiple on-going practical challenges that hinder the student usage of the ICT facilities. The most frequently mentioned are the cost and unreliability of electricity and internet provision, and the lack of space and lack of chairs in the computer room. In addition to the need for space, there is a need to ensure sufficient security and temperature control in the computer room and this is not an easy task for the more resource-poor schools within the partnership.

Impact on learning outcomes

It was not possible to assess the statistical significance of the programme in regard to student examination results in the programme schools. It is not possible to attribute any quantifiable change in school performance to the input of the ICT. However, there are numerous anecdotal accounts from head teachers regarding the way in which the programme has improved learning outcomes for students because of the motivational factor provided by the technology. However, there are multiple complex inputs and additional variables contributing to school improvement and ICT cannot be examined in isolation in a study of this nature. Despite this, the lack of definitive impact on learning outcomes should not be seen as a negative. As explored in the following section, it is possible that external changes to the education system may well mean that a quantifiable impact on learning outcomes can be demonstrated in future years.

ICT a compulsory subject

The current overall high level of appreciation for the partnership across the participating schools is enhanced by something that only occurred once the partnership was already in operation. In 2015, ICT is being introduced by the MoE as a compulsory subject and examination for the G9 exams at the end of primary. This is a significant decision in an educational context where the majority of schools do not have any access to computers and so all ICT lessons are solely theoretical. The schools in the partnership have a significant advantage as these exams are introduced because their students have had some exposure to using computers already. The importance of this was noted by the head teacher at Kamfinsa who expressed relief that 'we are a step ahead of other primary schools who are now having to catch up with the government's changes to the curriculum'. A similar sentiment was echoed by the head teacher at Riverain:

> 'The good thing about the partnership is that we have had time to prepare our learners for several years – unlike our colleagues who are just having to go to town to buy computers. So it has been a privilege for us. I am sure that the students here will do better than any other school – because the learners have had time to prepare for the exam properly. We feel we are the lucky ones – in the district then we are the ones doing well in ICT. Without the support of the partnership starting to use ICT would have been very difficult for us – so we think it is a job well done from the partnership.'

The decision from the MoE to make ICT a compulsory subjects has a range of positive and negative consequences but it will certainly serve to increase the level of interest and motivation in the partnership from the participating schools – because ICT is moving from the periphery to the core of the curriculum. The current programme coordinator explained the significance of this change:

> 'Before ICT was compulsory you would not get all the teachers coming for training – it was only the very keen ones that would attend – but now it is a compulsory subject they will be coming because it is required. This is not ideal – it doesn't point to the integrated use of ICT as a learning tool across the national curriculum – but it could well signify a major shift regardless. This could the time the partnership could really take off…

Looking to the future, it is likely to be possible to quantify impact on learning outcomes in relation to the ICT examination which was introduced in 2014. The programme schools have a significant advantage over non-programme schools because of the ability for students to undertake 'practical' work on the machines.

5. Three areas of special focus

5.1. Overview

The core of the Mpelembe basic schools partnership is the provision of computer labs alongside training and support in all the participating schools. However, one of the most significant positive impacts of the partnership is the way in which it has created a context within which other

beneficial initiatives can be catalysed. Three of these are highlighted below: the Zedupads initiative, the focus on special educational needs, and the women's ICT literacy programme. These are not the only related initiatives but they provide exemplars of the way in which the partnership is having a broader positive impact through using technology in education.

5.2. Zedupads initiative

Selected schools within the programme have recently received Zedupads alongside the computer labs and associated training. The Zedupads are small, handheld devices that offer interactive lessons for Grade 1-7 based on the national curriculum and available in English and Bemba.

The majority of interviewees were positive regarding the Zedupads, expressing that the main benefit is the way in which they present learning material that is based on the curriculum in a creative and intuitive manner. The head teacher of Riverain explained that Zedupads also mean the students are willing to engage with the material for longer than they might in a lesson taught on the blackboard: 'it is interesting to the students, it captures their mind and then they revise for longer … they answer questions on the devices, and then it marks it and it is an amazing experience for them'. In addition, interviewees noted the benefits of the material being adjustable to the needs of to each student. The multiple language options was also appreciated: a female teacher at Riverain expressed that the Zedupads were helpful because 'in the same lesson some of the students will use them in Bemba and some will use in English - so it is just up to the pupil'. Other benefits include the sturdiness of the devices, and the fact that students can operate them without significant previous ICT knowledge or assistance from their teacher.

The main challenge reported regarding the Zedupads is similar to the usage of computers. Despite all the benefits, the usage levels of the Zedupads is limited because many teachers still feel unsure regarding how to use them effectively. They are used by the confident teachers but left by others – because of the lack of extensive training and lack of integration with the curriculum: the devices are still primarily viewed as 'add-ons' rather than a central component of the students' learning. Teachers also said that they would benefit from having a greater number of Zedupads in their school. However, this suggestion should be treated with caution as the devices already deployed in the school are not yet being fully utilised. If more Zedupads are distributed then this should be accompanied by a more detailed and on-going training programme that has particular focus on how the teachers can integrate the use of the Zedupads into their core teaching practice rather than viewing them as an add-on. This will also require guidance from the head teachers, showing and reminding the teachers how the Zedupad content can be used with the students as part of the national curriculum.

5.3. Special Education Needs (SEN)

During the course of the programme, an innovative initiative has been established at Rokana, supported by IICD. The initiative uses ICT (Zedupads) to help children with SEN to access and remain engaged in education. The initiative is currently only in pilot stage but there is already highly encouraging early stage anecdotal feedback from participating teachers. Rokana has a designated SEN unit with between 10 and 14 students participating. The students are a range of different ages and have a range of different needs. The unit has three teachers trained in SEN. In

the region it is comparatively rare to have SEN facilities within a school. One of the teachers explained that of the approximately 100 schools in the area there are only five designated SEN units. Before the Rokana SEN unit was established, any SEN children were kept at home without any particular education or support tailored to them.

The anecdotal benefits of using Zedupads have been apparent in the SEN unit. Firstly, Zedupads have made a positive contribution to the literacy of SEN students. One of the SEN teachers reported that one of the SEN students was now able to attend 'normal classes' because of the way the Zedupad supplemented his learning and provided the additional literacy help that he needed. Secondly, Zedupads have assisting in increasing the interest of SEN students. A SEN teacher explained that the student attendance and engagement improves when they use the Zedupads rather than the conventional methods of 'just lecturing them every day … writing at the board'. She explained the benefits of the combination of visual and audio-based learning, and the positive effect of being able to hold a device:

> *'Because of the children's low attention span it helps them learn and they enjoy it - they are able to grasp what they are learning - they are able to remember and its easy … they grasp things faster by having something in their hands that they can learn with'.*

One of the girls attending the SEN Rokana unit has Cerebral Palsy (a general term for a number of neurological conditions affecting balance and co-ordination and causing muscle weakness and stiffness.) She is not able to hold a pen without help due to the muscle weakness. But for her the Zedupad has been helpful because she can press with her fingers without help. The SEN teachers explained that they were encouraged because the use of the Zedupad means that the level to which she can participate in school has significantly increased.

The teachers also mentioned two challenges which are largely specific to SEN students. Firstly, they noted that the Zedupads would be easier for SEN students to use if they were bigger, as the students struggle to read the small screens. Secondly, the SEN students in general have speech comprehension problems and as the Zedupad gives verbal instructions it is difficult for some of the SEN children to understand – they expressed that it could be made simpler to understand. However, these challenges should be understood within the broader context: Zedupads are not especially designed for children with SEN. The illustration demonstrates the way in which appropriate technology, when deployed within an already functioning system, can be of benefit to particularly marginalized children.

5.4. Women's ICT literacy programme

Another of the ICT-based initiatives facilitated by the Mpelembe partnership is the women's ICT literacy programme run by a local community-based organisation called 'both our hands'. This initiative uses the physical resources of Mpelembe to teach ICT literacy to under-resourced women within the local community.

As part of the study, the research team visited the literacy programme on both field visits and interviewed the women that were participating. All of the women were complete beginners prior to the programme, and each explained how their self-confidence in ICT usage had increased

significantly as a result of the training they had received. One young woman who works as a house help and also participates in the ICT literacy programme explained how it had helped her:

> *Before I started here I didn't know anything about computers – I had only ever seen computers on the TV. But now I know how to use. Then after the training Mr Gonzalo (former project coordinator) invited me to a workshop to learn how to repair computers – and now I can do that as well. To begin with I was shy but then I started to try. So far I have fixed four computers in the school and another four at the nursery. I attend the classes every day and can type at 20 words per minute. I'm able to prepare typed documents when people ask me to. My hope is that in the future I can be a teacher so that I can teach others about ICT as well. To begin with I was not confident but now I am confident. I always wondered what it was that made computers work – and now I know.*

On the first visit (November 2013) the programme was thriving and there were approximately 20 women attending each day. On the second visit (March 2015) the programme had reduced in size and was not operating every day. This was primarily due to the pressure on the founder of the community-based organisation: due to her multiple commitments it was not possible to sustain the classes every day. This demonstrates both the opportunities and constraints of additional initiatives associated with and facilitated by the Mpelembe partnership. The women's ICT literacy programme was catalysed because of the help of the partnership in providing the location, equipment and initial training. However, it still faced the challenges associated with small community-based organisations in terms of volunteer dependence and vulnerability to external factors. Nevertheless, it provides an encouraging example of the potential benefits of spin-off initiatives. It also demonstrates the need, within such partnerships, for such initiatives to be systematically reviewed when they emerge in order to determine whether or not they should be formally incorporated within the partnership structure and receive the associated support and increased chance of operating sustainably.

6.   Conclusions and recommendations

6.1. Summary

The impact study has assessed the overall effect of the initiative in three main areas: teacher capacity to make effective use of ICT in effective teaching, school management and administration capacity to make effective use of ICT, and student learning outcomes. The partnership has made significant progress and contributed to educational change in the participating schools.

The theory of change has been demonstrated in part but cannot yet be demonstrated in full. The inputs provided have begun to increase teacher capacity to make effective use of ICT and head teacher capacity to undertake effective school management. A foundation has been laid that can now be built upon. It is clear that the introduction of the technology has had a positive effect on student enthusiasm for participating in education. There are some anecdotal accounts of the partnership contributing to improved learning outcomes. This is very likely to be seen in the year ahead in relation to the newly-examined subject of ICT. For the programme to have a significant

impact on learning outcomes across all subjects it would require a more concentrated input of resources both human and technical, and may still be limited because of the wider educational challenges in the region. It is an ongoing challenge across the participating schools to move ICT from being an interesting addition to being a fully embedded aspect of the education system. The case study has explored the many reasons for this. It may be that an external factor, the introduction of ICT as a fully examined subject in G9, proves to be the catalyst for the benefits of the partnership to be more fully realized.

6.2. The place of the partnership

The case study also demonstrates that – when introducing ICT in a low resource context – it is a sensible approach to work through a locally based partnership. Others could learn from the example of IICD's collaboration with Mpelembe – a high-resource school with a commitment to contribute to the wider educational context. There is a genuine sense of partnership between the participating schools. Several head teachers noted their appreciation in this regard and expressed their hope that the partnership will continue despite the funding coming to an end. Interviewees at Mpelembe noted that the partnership has made them more aware of the broader educational needs in the area. The head teacher at Mpelembe noted that 'without it we would not have worked with those other schools in the partnership - the project has made the difference – and we have enjoyed working with them.'

Throughout the study, interviewees highlighted the vital contribution of IICD to the partnership. A recurring theme was the perspective that IICD's most significant contribution is the sustained, long term, on-going support and training provided since 2006, alongside the capital investments made. The former programme coordinator expressed:

> *'All of the different things that we are talking about here would not have happened without IICD … because they organise workshops, are in close communication, involve Mpelembe in the interantional sphere, have influence with the MoE – they put us on the map'.*

However, it is clear that the partnership is highly dependent on the sustained commitment and proactive engagement of the relevant staff within Mpelembe itself. Indeed, Mpelembe has a pivotal role at the center of the partnership. The other schools within the partnership have varied levels of engagement and commitment – largely due to their limited capacity. The future success of the partnership is dependent on the proactive, structured engagement and leadership of Mpelembe and its relationship with IICD and other related organisations.

6.3. Recommendations

In light of the findings it is recommended that the partnership consider the following elements for the future:

- Decide whether it is more appropriate to pursue deeper impact in the current schools, or to have a wider impact by expanding the partnership to include additional schools in the region.

- Invest intensive resources in building the capacity of Mpelembe to continue to lead the partnership into the future. This requires the agreement of detailed roles and responsibilities, a clear decision making structure and agreed schedule for regular visits and training for all participating schools.

- Develop a timeline for the upgrading of the technology in the schools. If there is no financial resource available then work with the schools to access other potential sources of funding.

- Prioritise on-going, in-depth training so that the teachers become confident and are incentivized to continue using the ICT. Hold the training regularly to account for staff turnover and do not rely on cascade models of training as they have been shown to be lacking in effectiveness.

- Consider supporting the on-going costs of internet connectivity and electricity so that the teachers can access online learning resources and the potential for the SMIS can be more fully realised

- Invest in deciding the most appropriate next steps for the introduction of SMIS software, recognising realising the benefits in the schools will require contextualisation, detailed training, and significant on-going support.

- Discuss the future of the partnership. If the decision is taken to stop funding then develop an appropriate exit strategy and provide the necessary training to give the partnership maximum opportunity to continue to grow and flourish.