JiFUNzeni: A Blended Learning Approach for Sustainable Teachers' Professional Development

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Abstract: JiFUNzeni blended learning approach is a sustainable approach to provision of professional development (PD) for those in challenging educational contexts. JiFUNzeni approach emphasizes training regional experts to create blended learning content, working with appropriate technology while building content repositories. JiFUNzeni approach was field-tested though a design-based research intervention conducted in rural western Kenya. The field test included design, development and implementation of a blended learning course for teachers' professional development utilizing appropriate technologies including tablets powered by solar energy, open educational resources and open source software. One year after the intervention, follow-up interviews were conducted with eight of the ten teachers and two professional development tutors (PDTs) who participated in the research. The findings from the follow-up interviews shared in this paper revealed that: teachers still used cooperative learning and activity-based learning strategies in their teaching. The PDTs on the other hand designed, developed and implemented one other jiFUNzeni blended learning course for twelve teachers in one school in Korogocho slum in Nairobi city. Implementation by PDTs of jiFUNzeni approach confirmed that they had learned through a sustainable way of delivering professional development in challenging educational contexts. The PDTs utilized the instructional design approaches learned through their participation in the research in designing blended learning content, while they also innovated new ways of developing self-study content as an important creative addition to what they had previously learned. Two teenage children participated in digital content development by advising the PDTs on some appropriate ways of applying technology thus, attesting to the fact that digital natives are important reciprocal supporters to digital immigrants and vice versa.

Keywords: Appropriate technology, blended learning, challenging educational context, jiFUNzeni approach, offline web content, open educational resources

1. Introduction

This paper presents findings on sustainability of one tested innovative way of delivering professional development for teachers in challenging educational contexts. While blended learning to enable teacher's access professional development has been utilized in many contexts, jiFUNzeni blended learning approach which is the focus of this paper lays emphasis on creating locally relevant content and use of appropriate technology including offline web content, open educational resources (OERs) and solar energy solutions. This blended learning approach is explained in detail after the background section in which the key themes in this paper are presented. The key themes are: blended learning and appropriate technology, professional development and challenging educational contexts.

2. Background

The key themes in this paper are presented as background to clarify and ground the themes within available literature as reviewed for this paper. First, clarification of blended learning and appropriate technology is the focus of the following subsection.

2.1 Blended learning and appropriate technology

Scholars have defined blended learning in various ways. For example, Picciano (2009) defined blended learning as a combination of online learning and face-to-face instruction. Other scholars such as Garrison and Vaughan (2008) delineate the components of blended learning stating that it is the fusion of online learning and face-to-face delivery of learning. These definitions of blended learning from the Western perspective are influenced by realities of the context in the western countries. Such realities include: abundant access to electricity on the grid, uninterrupted and cheap Internet connectivity, and access to powerful technologies such as computers and tablets. Thus for scholars from the West, it is quite in order to emphasize access to online experience when defining blended learning.

Defining and implementing blended learning from a challenging context such as rural Kenya, where jiFUNzeni field test was conducted calls for consideration of the contextual realities as well. Thus in a context where there is lack of access to electricity, Internet is not guaranteed, and schools lack basic amenities including clean and safe learning spaces, learning materials such as text books and facilities such as desks, blended learning must be redefined with consideration of the contextual realities. Thus such contexts are characterized as challenging educational contexts in this paper.

Some scholars in Kenya have written about blended learning with reference to contextual realities, yet they do not define it. Gunga and Ricketts (2007) while acknowledging virtual learning as implemented at Kenyatta University through the African Virtual University (AVU), suggested that a blended approach was more ideal because the Kenyan context was not ready for only virtual offering of AVU programs as had been expected, hence face-to-face components were later included. Simiyu and Macharia (2008) suggested that at Moi University, on recognizing the need to include teachers in their degree programs, blended learning approaches had to be utilized. These scholars suggested that the "blend" at Moi University consisted of face-to-face instruction to teachers, combined with online access to course content via communication tools such as email or discussion forums. These two examples of blended learning in Kenya, however do not clarify the understanding of blended learning.

In this paper, blended learning is defined as a deliberate combination of self-directed study of offline content deployed on tablets, with occasional face-to-face meetings, moderated through instructor-led sessions. This definition takes into consideration access to offline professional development (PD) content on tablets combined with teachers' face-to-face interactions with their peers and instructors referred to as professional development tutors (PDTs). JiFUNzeni blended learning approach emphasizes use of appropriate technologies for each context based on the contextual realities.

Appropriate technology was coined and extensively used by Schumacher (1973). Schumacher identified the characteristics of appropriate technology as (a) simple, (b) small scale, (c) low cost, and (d) non-violent. The United States Office of Technology Assessment further refined the definition of appropriate technology as: (a) small scale, (b) energy efficient, (c) environmentally sound, (d) labor intensive, (e) controlled by the local community, and (f) sustained at the local level (Wicklein, 2005). Sustainability at the local level has been qualified by Batteau as: "Appropriate technologies are 'appropriatable' technologies – devices and implements with which users can establish up-close and familiar relationships, so that mastering them no longer seems to be an insurmountable feat" (2010, p. 132).

Appropriate technology in the research reported in this paper refers to those technologies which are simple, small scale, easily connect with the local users and cultures; are sustainable within the local economic circumstances, and inexpensive (Wicklein, 2005). From a general perspective, Batteau asserted that examples of appropriate technologies may include bicycle-driven water pumps for arid regions lacking reliable electric supply or hand-cranked radios that never need to have their batteries replaced. They also include minimally featured cell phones that are more reliable than landline telephones in many challenging contexts (Batteau,

2010). In this paper, examples of appropriate technologies include inexpensive tablets, solar energy, mobile phones and open educational resources (OERs).

Notably, with the expansion of use of social media, tools such as Facebook, Twitter and online blogs are emerging as important tools for learning in challenging contexts. These applications, available on platforms such as mobile phones necessitate a review of online learning due to the affordances for learning on social media. Such appropriate technologies will continue to be useful in providing professional development, which is briefly reviewed in the following section.

2.2 Professional development

Professional development provides teachers with opportunities to reach beyond their current professional repertoire (Joyce, 2004). According to Joyce, teachers are wonderful learners who, when given just a few days of high quality professional development, can enhance their performance and make huge differences for their students. Joyce suggested teachers need help to make changes in their practice in curriculum, instruction and assessing student learning. The help envisioned by Joyce focused on professional development providers availing themselves as working colleagues to inquire with teams of teachers, becoming part of, rather than professional development 'presenters' (Joyce, 2004). This implies that professional development providers can no longer claim to be the ones who know and have to present to teachers, but rather consistent with blended learning modalities, there should be opportunity for teachers to take charge of their learning through self-directed study and exchange of ideas in face-so-face sessions.

The Kenyan education authorities recognize the importance of professional development as a potential contributor to change in teaching practice. The Kenyan Ministry of Education identified in-service education for primary teachers as an important component of the comprehensive investment program in education for the period 2005 – 2010 (Akyeampong, et al. 2011). However, although Kenya has an elaborate professional development infrastructure, including teachers advisory (TAC) tutors in the education field offices, not much has been done to institutionalize professional development. Instead teachers' professional development in Kenya consists of "small usually one shot projects by a variety of NGOs whose focus is usually dictated by the area of interest to the particular NGO" (Akyeampong, et al. 2011, p. 52). The country's educational aspirations cannot be realized with such unstructured and uncoordinated implementation of PD. Researching alternative ways of delivery of PD such as jiFUNzeni approach could contribute towards institutionalization of PD in such challenging educational contexts, a term which is elaborated in the following section.

2.3 Challenging educational contexts

It is suggested that there is a range of contextual circumstances inherent in educational contexts like the one in the study reported in this paper that would be characterized as challenging educational contexts. While it is acknowledged that there does not appear to be a commonly held definition of the term challenging contexts, there seems to be some consensus that such contexts are associated with high poverty levels (Chapman and Harris, 2004).

Harris (2002) writing on school leadership in schools that might be characterized as challenging contexts, interchangeably used the terms: schools in difficult circumstances, schools in difficult and challenging contexts, schools facing difficult circumstances, and difficult school contexts. The mixture of terms describing schools in similar situations can be very confusing. Harris (2002) pointed to the United Kingdom's Department for Education and Skills (DfES) designation of 'schools facing challenging circumstances' as those in which, among other circumstances, 35% of the students receive free meals, those schools with falling enrolment numbers and those serving inner city communities. The characteristics enumerated in the DfES categorization imply links to high poverty as a condition for designation of 'schools facing challenging circumstances'.

Challenging educational contexts can be defined as environmental, social, and infrastructural impacts that prevent individuals from reaching their potential and participating in both formal and informal learning (Crichton and Onguko, 2013). The constraints that characterize challenging contexts referred to in this paper include

- Access to consistently available and affordable electricity

- Access to reliable, unfiltered or censored Internet

- Access to previous formal learning and / or opportunities for ongoing formal learning that support individual learning needs

- Access to non-formal, yet appropriate learning opportunities

- Access to or participation in learning activities due to cultural or religious reasons

- Access to clean water and adequate sanitation

- Access to transportation and mobility

- Access to prior learning

- Other access situations linked directly to poverty (health, fees, low wages, inappropriate clothing, etc.).

The list of constraints above is not exhaustive, yet it suggests the types of challenges faced by learners and educators, including the participants in the study in this paper. The conditions enumerated above are common in many developing countries, thus calling for interventions that recognize the need to address the constraints through deployment of appropriate technologies that take into account the contextual realities. An intervention guided by the activity theory such as jiFUNzeni blended learning approach can enable alleviation of some of the challenges since teachers are able to articulate their needs; motivated to address the needs through active engagement, social interaction and collaborative effort. JiFUNzeni approach is explained in detail in the following section.

3. JiFUNzeni blended learning approach

JiFUNzeni approach was initially proposed by our team of scholars and innovators as a conceptual framework for making professional development accessible to over one billion people living off the electricity grid (Jifunzeni, 2010). *Jifunzeni* is a Kiswahili word that means inviting all to learn. This approach emphasizes working collaboratively with regional partners, to develop digital content relevant to the context. JiFUNzeni approach underscores a needs-based implementation of blended learning for professional development, delivered on appropriate technologies (Onguko, 2012).

There are four components in jiFUNzeni approach. These components are

- content development;

- appropriate hardware solutions;

- training; and

- access to a content repository.

The four components of jiFUNzeni approach are illustrated in Figure 1. These components include creating digital blended learning resources as PDF readings, video clips, audio podcasts, and pictorial images that are either embedded in HTML content or electronically published (epub) content. Thus jiFUNzeni blended learning is a simple way to digitally *tell*, *watch* a pamphlet, *read* information, and *build* instructional capacity through the thoughtful development and delivery of relevant content, enabled by appropriate technologies (Crichton and Onguko, 2013). Selection of appropriate technology for each context is an important component in this framework. Training of regional teachers as providers of innovative learning content through blended learning

is one of the core components of jiFUNzeni approach. The content developed through jiFUNzeni initiatives will continue to be made available to other users as open educational resources on a content repository available at www.jifunzeni.com.
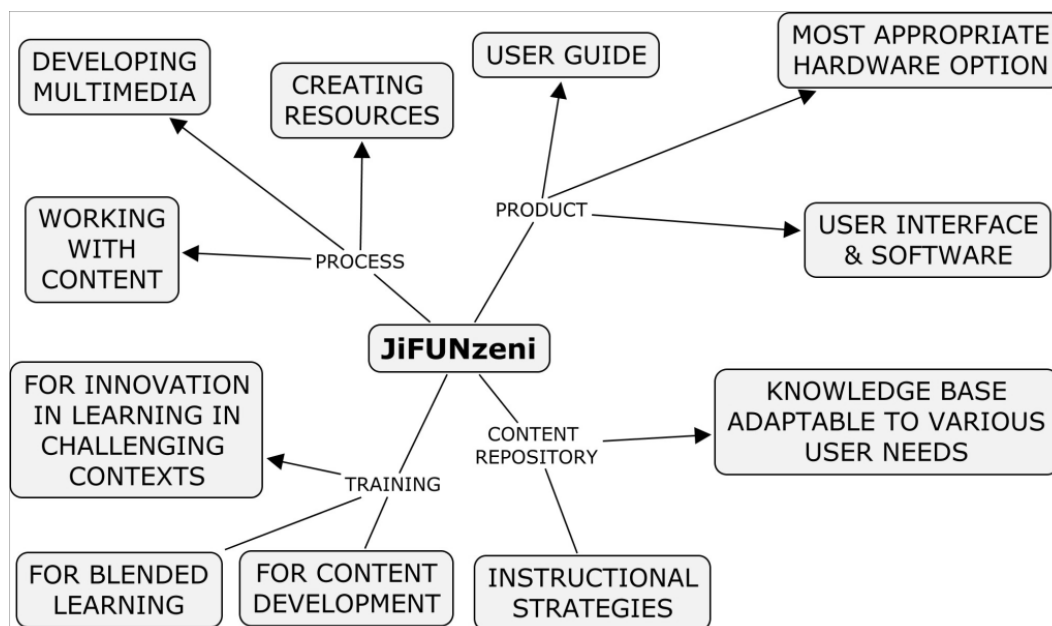

Figure 1: Components of jiFUNzeni approach (Source: www.jifunzeni.com)

Initially jiFUNzeni blended learning approach was a theoretical proposition that needed to be tested in the real world where solutions to professional development needs were required. In summer 2010, jiFUNzeni approach was piloted with six teachers in Nairobi, Kenya to establish whether jiFUNzeni as a theoretical proposition could be implemented in practice in an urban context before actual deployment in a rural setting without electricity. After the success realized through the pilot, jiFUNzeni was then deployed for field test in rural western Kenya, which is the focus of the research in this paper.

JiFUNzeni approach is grounded in activity theory (Engestrom, 1987) complemented by self-directed theory of adult learning (Merriam, 2001) and situated learning theory (Lave and Wenger, 1991). Activity theory provides for a needs driven and goal directed process through tool mediation, and entails division of labour and isolation of partial tasks implemented by participants in a community of relationships. Key features of activity theory are active engagement and social interaction, which was the basis for teachers during field test of jiFUNzeni approach to collaboratively work with each other, studying through appropriate technologies to inform their teaching practices. Situating the field test within their work-context enabled teachers to implement teaching strategies they studied in the content i.e. cooperative learning and activity-based learning.

4. Research methodology

The research in this paper used qualitative research specifically design-based research paradigm. In conducting design-based research according to Walker (2006), a researcher's rigorous analysis of a learning problem leads to specific ideas for intervention. "Designers then build systems that use information technology to build specific teaching and learning materials and methods designed to realize learning gains predicted by theory and research (Walker, 2006, p. 11). Walker suggested that if the theoretical analysis is right then these interventions ought to give markedly more effective results. Thus, it has been argued, literature on design research is unanimous that the goal is useful innovation with particular emphasis on investigating the possibilities for educational improvement by bringing about new forms of learning in order to study them (Schwartz, Chang and Martin, 2008). Thus jiFUNzeni blended learning as a theoretical proposition was actualized through design based research reported in this paper.

The data in this paper was drawn from interviews with the participants and documentation of design artifacts. Interviews conducted one year after the initial field test of jiFUNzeni approach and documented design artifacts of a second intervention implemented by the PDTs in Korogocho in Nairobi are the sources of data shared in the paper.

Design artifacts were documented by the PDTs during design and implementation of PD content. Documentation of design artifacts is a means of providing insights into the 'making of' the design (Kelly, Lesh and Baek, 2008). Kelly, et al. explain that the process "involves not simply sharing the designed artifact, but providing rich descriptions of the context, guiding and emerging theory, design features of the intervention and the impact of these features on participation and learning" (2008, p. 13). The PDTs documented the design artifacts some of which are shared in Figures 2 and 3 in this paper. Following the brief presentation of research methods, the data is presented in the following section.

5. Presentation of results

The results discussed in this section are drawn from data gathered one year after jiFUNzeni field test, with a view to getting evidence of the potential for sustainability of jiFUNzeni blended learning approach. The results are presented at two levels: first, findings from interviews with PDT's on design and implementation of jiFUNzeni blended learning in Korogocho slum in the city of Nairobi; and secondly follow-up interviews with eight teachers' one year after jiFUNzeni field test in rural western Kenya.

5.1 PDTs' design and implementation of blended learning

Two PDTs who had learned through jiFUNzeni field test retained the appropriate technologies including tablets, solar charging equipment and flip camera for their use in designing and implementing other blended learning programs for teachers' professional development. They subsequently worked with twelve teachers in one school in Korogocho slum of Nairobi to implement one blended learning course on assessment of learning. Findings from interviews with them are shared in the following subsection.

JiFUNzeni approach in Korogocho

At interviews with PDTs, they stated that they learned through jiFUNzeni field test research and thus designed and implemented jiFUNzeni approach without the support of the researcher. Commenting on their experiences in blended learning, PDT1 said:

Starting with the design, it was tough. Tough because, you see the previous year we were together [with researcher] and therefore if there was a little problem we had someone to troubleshoot. When we got a problem, we had to sit back and ask ourselves, ok! So where do we go from here? What do we do? And for that reason it took us slightly longer to write the program - design it. But for me the joy was, it is true I did learn because even without having someone to fall on back immediately, in this case, to fall back on you [researcher] and ask what do we do now? We still were able to go on and do the design and in fact learn new ways; some short cuts to what we did (Interview).

Further discussion with the PDTs on creation of multimedia content revealed that their two teenage children guided them on use of the tools at their disposal for creating content. They called the two children "digital natives" based on the concept of digital natives popularized by Prensky (2001). PDT2 stated, "We had the phone, then we also realized that we could use the laptop for audio recording. In fact the laptop [use for audio

recording] we were reminded by the digital natives" (Interview). PDT1 clarified: "The natives are my daughter and my colleague's son" (Interview).

The "digital natives' contributed to efficiency in application of technology. PDT2 articulated the role of the teenagers as:

What they did, we came up with a story board and we thought the part you [researcher] played when we recorded the audio content needed another voice, so we used Jay's voice to role-play some parts like the introduction. And then Penny was the one who was handling the gadgets. So there was division of labor. And they were the ones who reminded us we could use Bluetooth to transfer [multimedia files]. Like when we had finished [compiling] the course, we were going to export from one laptop to the other. We were thinking of using email. So we were busy looking for email, connecting to the Internet to email to each other then the two of them laughed and said what are you people talking about. These laptops have Bluetooth! (Interview).

Further discussion with the PDTs revealed that the 'digital natives' contributed more to content creation. As indicated by PDT1 in this excerpt:

Even when recording audio, we tried the telephone and it was not working. Then they said, if it is not working, use the laptop. The laptop has a recorder why don't we just try that. And you know when you imagine that this is an 18 year old and a 13 year old guiding us, then we truly could say these are digital natives (Interview).

The blended learning content designed by the PDTs is evident in the screenshot in Figure 2. It was heartening to realize that PDTs referred to division of labor when talking about their role and that played by the 'digital natives' because in jiFUNzeni field test, division of labor was an important component together with development of a community as in activity theory (Engestrom 1987) which is an important guide for the jiFUNzeni blended learning approach.

Figure 2: Screenshot of offline web content

PDTs discovered new ways of developing multimedia content apart from the initial processes during the field test of jiFUNzeni learning approach:

On downloading videos from YouTube, we did not go through the process we had gone through earlier. We went to Edutopia website and it was clearly advocated that we could use their resources and share or use their material for educational purposes. The YouTube videos just downloaded automatically (Interview, PDT2).

The explanation on free access to web content from Edutopia website was important at this juncture because in the initial field test of jiFUNzeni, we had to seek for permission to use content from Latika Roy Foundation in India via email. Access to open content that could be repurposed for each context is an important part of jiFUNzeni approach as it is proposed for challenging educational contexts that lack educational resources among other challenges.

On implementation of jiFUNzeni approach in Korogocho, the PDTs expressed their satisfaction in the interview:

The theme of our course was assessment. We had previously had a one-day workshop with the teachers and they had requested us to talk about assessment. We designed a course that would take six weeks and we had three units. When we met the teachers on the first face-to-face, we had to introduce them to the technologies including how to use them. The school had electricity, which they used to recharge the tablets. (Interview, PDT2).

Clearly the two PDTs had changed their delivery of PD from entirely face-to-face offering to blended mode as suggested above. It is noted here that the teachers had requested them to "talk" about assessment, but then PDTs went to the teachers with more resources in various formats that went beyond just their "talking" to them. PDT2 described the processes and the activities they engaged in.

We requested the teachers to allow us to visit them in their classrooms for observation just to see if they were able to implement the content they were reading, in their teaching. At least we saw each and every teacher in their classrooms, some of them even three times. The teachers were drawn from a whole range of sections from baby class to grade seven, which was the highest grade (Interview).

The content provided by the PDTs spoke to teachers through the audio and video content, teachers read content through self-directed study as in the quote above rather than PDTs being the only ones "talking" to teachers. PDT1 explained the value of blended learning to teachers from a general perspective.

One of the things we have done before, are workshops with teachers. In those workshops, we just relied on face-to-face and they would come where we are. One of the successes of blended learning is that it allows the teacher to remain in the classroom yet at the same time be able to do professional development. We tried to gather some data about these teachers. Majority of them had not accessed PD before. When we asked them why, they said that with the work they have, it is not easy for them to go out for professional development because they have a lot of work in school, they have responsibilities at home and it is also expensive. So by doing blended learning you allow that teacher not to withdraw from the classroom, yet at the same time to get opportunity to grow as a teacher through professional development (Interview).

The interview with PDTs on design and implementation of jiFUNzeni approach on their own, in a different context from the field test site suggests they learned through their involvement in field test. These are hallmarks of a sustainable approach to provision of PD in such challenging educational contexts. Figure 3 is evidence of offline content on the tablet used for self-directed study.
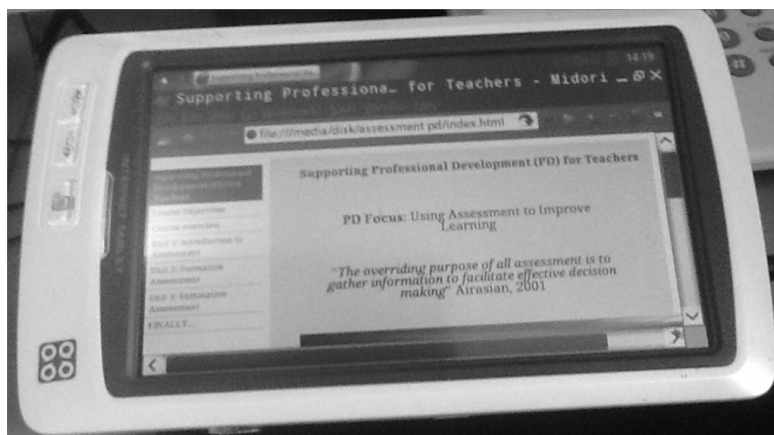
Figure 3: The tablet used by teachers for self-directed study

In the following section, data from teachers' interviews is presented.

Teachers' views during follow-up interviews

Eight of ten teachers who participated in jiFUNzeni field test in western Kenya were still teaching in the research school when the follow-up interviews were conducted. The objective of conducting the interviews was to establish whether one year after the intervention, teachers still applied teaching strategies learned through jiFUNzeni approach. This was in a bid to identify whether indeed jiFUNzeni could be a sustainable approach to providing professional development in a challenging context.

It was not, however, possible to observe teachers applying the teaching strategies in their teaching because the researcher's visit coincided with the examinations period just before school holidays at the end of term two of 2012. The eight teachers responded to the follow-up interview questions. When asked whether they still used the teaching strategies they had learned a year earlier, Nita responded, "Yeah! We still use especially group work [cooperative learning]. I even have some books here I am marking arising from work done by my students in groups" (Interview). This response implied teachers continue to apply cooperative learning, which was one of the teaching strategies introduced to them through jiFUNzeni approach.

Asked if they could remember what the teaching strategies they learned one year earlier were, Churchill stated: "I remember we looked at different approaches to teaching and learning, specifically cooperative learning and activity-based learning such that the children interacted and learned from each other" (Interview).

When asked how the strategies were helpful in their teaching, Churchill observed:

These [strategies] were very helpful because use of cooperative learning enabled the teacher to ease the burden of being the sole presenter and were able to engage the learners. Learning became participatory; there was peer-learning and sharing for example, through use of round-robin approach (Interview).

On responding to the same question, Loise stated, "through the use of teaching and learning aids [learning materials] the learners were able to manipulate some of the materials and this helped in their remembering of what was learned in class" (Interview). The responses by teachers suggest that they continued to engage students as active participants in learning as opposed to the passive participation students were exposed to before the intervention.

Mika also followed up in responding to the same question emphasizing:

With the approaches we were able to engage the learners and make learning real. When we use examples we make learning abstract but now using the approaches we make use of locally available materials all found within the school and make learning real (Interview).

Mika's response suggests that by teachers engaging their students in cooperative learning and activity-based learning, they enabled the students to engage in learning by doing, thus "making learning real". Another question was on the successes the teachers had had so far in using the teaching strategies. On this, Nita stated:

In a nutshell there is some achievement, for example, you will give them an assignment. When they work individually, they don't score as high as when you allow them to discuss freely then they come to a conclusion. So you find that when they work as a group the scores are high because many heads are brought together, they share ideas before they come to a conclusion. They go to the extent of having to appoint a chairperson to control the discussion, a secretary to write. At least they develop self-esteem to work (Interview).

Nita's response not only suggests that students learn better when they engage in discussions and doing activities with others, but also that they gain by taking on responsibilities such as leading in the cooperative groups. On challenges encountered in using the teaching strategies introduced to them through the research, Emah stated:

On the use of the materials, sometimes you find that you have to purchase these materials. Some of those locally available are not very good; are not very reliable, you need to purchase them and yet we lack the resources (Interview).

Teachers were also asked to share the surprises encountered in implementing teaching strategies over the year. Nita stated: "There are some surprises. Just the other day, Loise was complaining that parents couldn't give a spoonful of sugar and salt when it came to mixing in science. So we get surprised because the parents are not supportive". On the same issue, Loise stated:

We also need support. You see when a teacher requests for a tea-spoon (of sugar) from every child, at the end of the day parents think you are collecting sugar for use in school. They even don't see the need. After all they understand that we have free primary education in Kenya so nothing should come from them. The parents think if you get a spoon of sugar or salt from every child, then you have so much sugar or salt. If you tell them: ok I want everybody to contribute a shilling we buy the items, you know even getting that shilling is very hard (Interview).

The responses by Nita and Loise suggest a need to sensitize the parents and school community members on their support responsibilities for the teaching and learning process. For schools in challenging educational contexts like the ones involved in the research in this paper, it is always a problem to find learning material. Contribution by the parents towards learning resources like sugar as mentioned in the excerpts is crucial for authentic and practical learning. Otherwise learning remains abstract.

A detailed discussion of the findings follows in the next section.

6. Discussion

Data gathered in interviews one year after jiFUNzeni field test led to the results presented in the previous section. The study revealed that for the PDTs who already offered school-based face-to-face professional development to fellow teachers, it was easier to improve on delivery of PD by shifting to blended delivery format. PDTs in the study first engaged in a two weeks usability test of jiFUNzeni approach, then together with the researcher designed and implemented the field test of jiFUNzeni approach (from February to June 2011) and were subsequently ready to implement one such blended learning course with teachers in a school in

Korogocho on their own. This attests to the need to empower teachers in challenging contexts to enable them utilize appropriate technologies in providing professional development to their colleagues.

Lessons so far learned from implementation of jiFUNzeni approach in two sites point to the importance of awareness of contextual realities in implementing PD through blended learning. It is clear that each context presents variations in terms of infrastructural and professional development needs. For example, in the rural context of western Kenya where electricity was not available, jiFUNzeni approach was implemented with power harvested from solar energy. However, when implementing the second jiFUNzeni blended offering in Korogocho in Nairobi, teachers had access to electricity. While the same tablets were used in both sites, the power options differed on the basis of the contextual realities. This reiterates the importance of considering the jiFUNzeni components, which emphasize training local experts while selecting the most appropriate technology options. In terms of professional development, the teachers in rural western Kenya were in need of PD on teaching large class sizes while teachers in Korogocho needed PD on assessment for learning. These were outcomes of the needs assessment done before the interventions at both sites.

An important addition to jiFUNzeni approach by the PDTs realized through the offering in Korogocho was involvement of teenage children (referred to as digital natives in this paper) in instructional design. While they did not contribute towards generating content, the teenage children were however, very instrumental in supporting PDTs in terms of technology stewardship. The digital natives who are so-called because they were born in times when the current high levels of digital technology in society was already upon us, speaks to the reality that teachers and parents have no choice but to also learn from the younger generations. The quality of the multimedia course content was for sure boosted by involvement of the teenagers, as PDTs readily accepted and indeed learned from their input. Teachers and parents no longer have monopoly of knowledge and skills arising either from experience or training. Young children are able to share their knowledge and skills owing to the times in which they live.

For the interviews conducted with teachers one year after jiFUNzeni field test in rural western Kenya, it was apparent that the teachers learned important teaching strategies, which they continue to use in their classrooms. Teachers' responses at post-intervention interviews held after one year indicated that they continued to use cooperative learning and activity-based learning strategies. I argue that providing PD for teachers in work-based environments in their schools and classrooms has an advantage of providing real-life experiences that can last longer in their practice. If teachers were engaged in PD on activity-based learning and cooperative learning strategies in a traditional professional development session where PDTs invite teachers to "talk" to them in a face-to-face course away from their schools, implementation in classrooms would have been difficult.

The findings reported in this paper confirm that jiFUNzeni, which was initially presented as a theoretical proposition was actualized in practice as evident from the two sites where it has been implemented. Scale up of jiFUNzeni blended learning approach is the next step of action as we are proposing to establish JiFUNzeni Innovative Learning Centre (JILC) at our university. The proposed JILC will act as an incubator for best practice in applying appropriate technologies in teaching and learning in challenging educational contexts. This is a task we look forward to with a lot of enthusiasm.

7. Conclusion

This paper has illuminated the background to jiFUNzeni blended learning approach, data arising from its implementation and its potential for sustainability. Challenging educational contexts like the ones described in this paper i.e. rural schools and schools in slum areas in cities, require specific contextually relevant and driven interventions such as jiFUNzeni blended learning approach. It is gratifying for me to note that jiFUNzeni blended learning approach; a theoretical proposition has been implemented in practice in the challenging educational contexts with evidence of potential for sustainability based on the findings presented in this

paper. It is with great satisfaction that I look forward to sustained scale-up of jiFUNzeni approach as one of the champions of the approach.

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