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Title: Capturing changes in Sudanese teachers' teaching using reflective photography

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Abstract:

Capturing and interpreting how teachers make sense of and take up new classroom practices is difficult, particularly in remote and resource-challenged classrooms and when researchers are working across linguistic and cultural boundaries. This article reports on a study that used reflective photography with B.Ed student teachers in Sudan. The Open University of Sudan recently introduced a handbook to support teachers in developing greater capacity for reflection. We were keen to understand how teachers interpreted and made use

of this handbook. Here we comment on data from this project and its usefulness

for offering insight into how teachers reify new practices.

Keywords: In-service teacher education, teacher reflection, reflective photography, Sudan

1. Introduction

Across Sub-Saharan Africa enrolment is progressively rising in primary education classrooms but increasingly attention is shifting to a critical examination of the quality of the learning experience. Learning achievement is often relatively low with large numbers of pupils failing to make progress particularly at lower grades (UNESCO, 2010). Research has suggested that the influence of school on pupil learning is more pronounced in low-income countries (Vespoor, 2003) and of all the variables that impact on schooling, the quality of teaching is one of the most critical and one where governments can act (Moon & author 1, 2012). Over the last ten years there have been a considerable number of policy developments, curriculum reformulations and pedagogic focussed interventions informed by learner-centred pedagogy aiming to improve the quality of teacher-pupil interactions in primary classrooms across Sub Saharan Africa (Altinyelken, 2010; Barrett, 2007; Chisholm & Leyendecker, 2008; O' Sullivan, 2006). However, to date there is little evidence - from completion rate data and international numeracy and literacy tests - that such initiatives have achieved their aims (UNESCO, 2011). Teacher-centred practices appear particularly resistant to change and much recent research on African classrooms shows that the dominant mode of teaching remains a teacher-led transmission style in which pupil talk is restricted to short, often chorus, answers to closed questions (Pontefract & Hardman, 2005; Akyeampong et al, 2006; Altinyelken, 2010; Henevald et al, 2006; Mtika & Gates, 2010).

A variety of reasons have been suggested for this lack of progress but a common theme is the lack of attention shown to context – at the local, school and classroom level, systemic contextual factors such as policies, the demands of the curriculum and associated high stakes examinations and teacher resistance to change. (Chisholm & Leyendecker, 2008; Hardman et al, 2009; Tabulawa, 1997). These

findings are not unique to Sub Saharan Africa; reviews of the literature across the globe confirm that teachers' beliefs and actions are not easily changed and that more extended collaborative activities are required to shift teachers from ideas of teaching they acquired as pupils and students (Clift & Brady, 2005). Learner-centred pedagogies demand complex classroom practices from teachers, involving greater uncertainty in the learning situation, increased flexibility and a variety of approaches to respond to learners' needs (Darling-Hammond, 1990). Teachers' development of this skilled expertise over time is situated and embedded in their contexts of practice, they align their skills and personal characteristics to conditions afforded in their own context, both material and symbolic (Wenger, 1998). Teacher learning is thus engagement in new forms of practice – a movement deeper into practice - and occurs as teachers reconfigure elements of their existing practices by conscious negotiation through activity. How, and the extent to which, teachers negotiate their engagement with initiatives to develop new practices, will be framed and influenced by national, regional and the local context including national curricula, available resources, funds of knowledge, community expectations and school priorities. Failure to consider sufficiently the characteristics, opportunities and constraints of the practice context in which teachers are working and to adapt programmes accordingly can result in little or highly restricted pedagogic change (Schweisfurth, 2011).

In this paper we explore whether the use of reflective photography can deepen our understanding of the ways in which teachers mediate and engage in new practices; what Wenger describes as their 'learning events and forms of participation' (Wenger, 1998:155), to inform the future development of appropriate and sustainable forms of professional development. The project worked with a small group of primary school teachers in Sudan who were enrolled on a BEd programme through distance learning with the Open University of Sudan (OUS). We were interested in exploring shifts in their approaches and behaviours as they engaged with the programme materials,

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these have a particular focus on teacher learning through participation in classroom activities, utilising materials from the TESSA (Teacher Education in Sub-Saharan Africa) programme. The research was undertaken by academics from the Open University, UK (OUUK) working in partnership with colleagues from OUS. The paper also describes the sensitivities that arose using a non-traditional research approach in very traditional academic and educational communities.

2. Context

2.1 Sudan: the social, political and educational context

The study reported in this paper was carried out in schools on the outskirts of Khartoum – Sudan’s capital - in 2009 and 2010. At this time, prior to the secession of South Sudan in July 2011, Sudan was geographically the largest country in Africa. It had a population of 34 million, consisting of over 600 different ethnic groups and divided between Arabic speaking Muslims in the north (where Khartoum is located) and English speaking Christians in the south (World Bank, 2012). Sudan is ranked in the bottom 20 countries in the UNDP’s Human Development Index (UNDP, 2012) and is characterised in the media by conflicts over religion, ethnicity, land and resources. However, country-level data on welfare and development (especially so soon after the secession) is hard to come by and masks an uneven distribution of economic wealth and power that are concentrated in Khartoum.

Politics, power and culture have been contested in Sudan since independence in 1956 with nationalist and Islamic values in Sudan strengthened following a military coup in 1989. The Ministry of Education made Arabic the sole medium of instruction (including at universities which historically had taught in English) and the ideological-religious principles of an Islamic state were embedded in the school curriculum. Subsequent curriculum developments, including the new Primary Curriculum

introduced in 2000, have also foregrounded the need to encourage pupils to think critically, solve problems and take responsibility for their learning (Sudan Federal Ministry of Education, 2004) in-line with the international rhetoric around learner-centred teaching.

Since 2011 basic education has consisted of eight years of schooling, but data around pupil enrolment, retention and attainment is confounded by acute differences between education systems in the north and south prior to secession. Due to political, cultural and linguistic differences, schools in the south were generally run by NGOs or religious organisations and followed either independent curricula or that of neighbouring Uganda. Although nationally pupil enrolment at the primary level was 67% in 2008 this masked regional variations. More recent data from South Sudan suggests that in this new country less than 40% of primary age pupils attend school (Brown, 2012). The ratio of pupils to teachers with a professional teaching qualification in Sudan is 1:37 (UIS, 2011) but as high as 1:201 in South Sudan where the highest qualification held by half of teachers is a primary school leavers' certificate (GRSS, 2011).

Until 1990 the minimum qualification for teaching at the basic or primary level was graduation from junior secondary school followed by a Diploma in Education. Most teachers acquired this diploma through a four-year, pre-service, college-based course. A smaller number of teachers, who were unqualified but had at least a year of teaching experience, obtained their diploma through a two-year in-service programme (UKNARIC, 2007). In 1990 the government, determined to improve the primary education system, raised the status of teaching to a graduate profession. Teacher training colleges became affiliated with universities to offer BEd courses (UKNARIC, 2007). This shift set Sudan apart from other countries in the region;

twenty years later a certificate or diploma remain the minimum qualification for teaching at the primary level across much of Sub-Saharan Africa.

But by 2002 it was estimated that less than 10% of the country's 130,000 primary school teachers held a BEd (Sudan Federal Ministry of Education, 2004) and the Open University of Sudan was created in 2003 to become the main provider of the BEd qualification. OUS is a government-funded institution that provides in-service teacher education through distance-learning methods that enable teachers to study while remaining in their post. Based in Khartoum it operates through 73 training centres and 350 sub-regional centres across the country. The BEd is a four-year programme; student teachers attend tutorials and receive study materials at sub-regional centres. Over the four years students undertake three phases of teaching practice each lasting 3-4 months, assessed by OUS supervisors who visit up to 3 times during each teaching practice period. This is seen by OUS staff as a key component of the programme: programme leaders believe firmly that teaching skills are developed in practice rather than learnt in lecture halls (Author 1 & Author 2, 2012). In 2008 nearly two thirds of Sudanese primary school teachers had studied with OUS. Over 90% of these were based in what is now Sudan (TESSA, 2011a).

2.2 TESSA (Teacher Education in Sub Saharan Africa) involvement in the OUS BEd programme

TESSA is a network of African and international institutions engaged in teacher education which have been collaborating since 2005 to improve the quality of pre- and in-service teacher education at scale in sub Saharan Africa (Moon, 2007). The consortium is led by the Open University, UK and has received funding from a number of philanthropic trusts and government agencies. Consortium activity has focussed on collaborative production of an extensive series of Open Educational Resources (OERs) to support teacher development and pedagogical change. These

OERs are freely available from the TESSA website (www.tessafrica.net) in a number of languages, formats and versions, appropriate for different cultural and linguistic contexts and, in each case, matched to the relevant pupil curriculum. In each country the OERs were adapted to ensure congruence with the National Curriculum and appropriate cultural, historical, environmental and linguistic examples and references - this process is described in detail in previous accounts (Author 1 & Author 2, 2012).

TESSA OERs have a transparent pedagogy and discourse about learning. They are distinctly interactive, moving teachers from generalisation or principles of practice to highly specific authentic classroom activities, designed to be carried out with their pupils (Putnam & Borko, 2000). Activities within the units guide teachers to a more active participatory pedagogy, one which recognises pupils' perspectives in the process of learning and acknowledges that pupils are able to reason and make sense of and hold theories about themselves and their surroundings (Bruner, 1996). The materials detail the use of investigations, group work, problem solving, materials and resources from the local environment and community and so on (Author 1, 2008) to help teachers develop authentic understandings of their practice and acquire skills to implement changes in their practice. Augmenting the activities are case studies offering teachers the opportunity to see below the surface of the teaching and learning episodes and into the thinking of experienced teachers, thus helping to make explicit teacher professional knowledge (Author 1 et al, 2009). TESSA OERs encourage participation and experimentation in a manner which is in sympathy with the context in which teachers are working, offering the potential for differentiated and contextualised professional development for practitioners. They have been integrated into teacher education programmes according to local needs and cultural, financial and policy environments. Data from TESSA partner institutions in 2010 shows TESSA OERs are included in 19 programmes (including BEd, Diploma, Certificate

and unaccredited CPD courses) across 10 countries in Sub Saharan Africa (TESSA, 2011b).

As members of the TESSA consortium, colleagues from the Open University of Sudan were involved in the writing, translation into Arabic and adaptation of the TESSA OERs for the Sudanese context. During 2008 OUS undertook a pilot project using TESSA OERs with student teachers (TEAMS, 2007). Following evaluation of this trial OUS made a decision to produce a handbook of TESSA OERs for BEd students to use in their final teaching practice. Each teaching practice focuses on the teaching of progressively older pupils, corresponding with the three cycles of the Sudanese primary curriculum. The third cycle teaching practice thus focuses on the teaching of specialist curriculum areas with pupils in the two final years of primary school and, unlike the first two cycles, there is no national set text for third cycle. The new TESSA handbook presents a sequence of classroom strategies, mapped to the Sudanese curriculum for upper primary pupils, such a focussed approach on a specific pedagogy has been shown to have the potential to influence the practices of teachers (Brouwer & Korthagen, 2005) . Teachers on the programme were introduced to the handbook at a local tutorial session and then required to study it and try out the ideas from the activities in their classrooms. Supervisors (visiting tutors employed by OUS) assess the teachers against a list of competences linked to the teaching strategies presented in the handbook.

OUS evaluated the use of this TESSA handbook through a range of studies: a large-scale questionnaire for student teachers and their supervisors across the country; analysis of supervisor observation notes and interviews with a sample of supervisors. To complement these, a reflective photography project with ten BEd student teachers was undertaken in collaboration with researchers from the Open University UK. It is this last study we report here. The main focus of our paper is not the extent to which

teachers take up the strategies promoted in the TESSA OERs, but rather an exploring of whether reflective photography was useful in helping us to understand the ways in which teachers take up these pedagogical challenges in their own contexts and how conditions in their schools have supported or constrained their selection and adoption of these practices.

3. Conceptual framework

Capturing the processes of teachers' changing practice can be resource intensive and intrusive. Historically pedagogic studies in Africa have involved detailed classroom observations but the presence of researchers (particularly those from an outside culture operating in a post-Colonial context is fraught with issues which distort the behaviour of both the teacher and their pupils. (Gokah, 2006)) Equally importantly the presence of an external observer habitually serves to reinforce prevailing hierarchies and the notion of a 'correct' way to teach rather than supporting teachers to be agents of change in the local context. Mtika (2010) working in Malawi speculates that once the requirements of supervision are lifted many teachers shift away from learner-centred practices, whilst others looking at classroom practice suspect that they are viewing show lessons, especially rehearsed for such an occasion (O'Sullivan, 2006).

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The OUS supervisors were engaged in classroom observation as part of the BEd assessment programme but we were keen to complement this in a way that would privilege the voice of the teacher. We were interested in aspects of the endeavour which are not easily visible to an external observer (either supervisors or researchers) or may be influenced by their presence, to question what is taken for granted in practice whilst also helping teachers to develop their understanding of classroom processes and hopefully support increased professional satisfaction

(Loughran, 2010). Photography was chosen to enable teachers to show their classrooms and their work as they see them. However, photographs themselves do not provide the complete narrative (Lemon, 2007) but rather offer prompts for discussion and thinking about particular episodes. They provide a record in the same way as journal entries, autobiographical narrative and observation notes (Foss, 2010) or critical incident logs. Such methods were considered by the project team but a lack of a shared language mitigated against use of these techniques, together with time constraints (for both teachers and researchers) and a desire not to augment the teachers' workload. We were also aware that teachers would lack familiarity with articulating their pedagogic reasoning and potentially find it deeply challenging (Loughran, 2007; Oteino, 2009; Miles, 2011). Other researchers have gained interesting insights into teacher development through online collaborative journal writing (Okseon, 2010) but at the time of the research this was not a viable tool - there was extremely limited internet connectivity in the Khartoum districts in which we were working.

Photography in anthropological studies has been criticised for being unsystematic and unscientific (Hurworth, 2003), for assuming that power lay in the hands of the researcher and for silencing and objectifying research participants (Clover, 2006). Reflective photography on the other hand, like participatory photography, photo-novella or photovoice, involves the creation and interpretation of an image by research participants rather than researchers. Through choosing what to capture on film participants have the opportunity to represent aspects of their environments that are important to them and that may otherwise be overlooked or rejected (Lunch & Lunch, 2006). In this sense the resulting images are both the data and the findings of a project and become a 'participatory site for wider storytelling' (Singhal et al, 2004:7).

At the time of writing there are very few examples of reflective photography in Sub-Saharan African classrooms. Mitchell et al (2010) use the technique to explore urban pre-service teachers' experiences of poverty and transformation during teaching placements at rural schools in South Africa and Canada. De Lange et al (2006) explore teachers' experiences of HIV/AIDS in South African schools. Miles (2011) uses a combination of photo-elicitation (with teachers discussing photographs taken by researchers) and reflective photography (with photographs taken by pupils) in a project researching inclusive education in Tanzania and Zambia. None use reflective photography as we intended, to begin to understand how teachers are engaged in a continued re-invention of practice in their classroom, rather than a before and after effect. We hoped that reflective photography might reveal a slowly deepening engagement with their practice and 'make visible through documentation the metacognitive processes of teaching and learning' (Moran and Tegano, 2005: 18). It was intended that the photographs would provide shared observational data, a mutual reference, for both teacher and researcher and from which the researchers could probe into the teachers' intentions and developing knowledge. Thus beginning to open what Rozelle and Wilson call the "black box" of field experience' (p1197, 2012), and beginning to develop our understanding of the interactions and steps that teachers take when attempting changes in their practice. The focus on the photographs as the main point of reference during subsequent discussions was intended to give status to the participants – reflecting their interests as well as those of the researchers,. In the interviews we aimed to probe their thoughts and feelings at the time of the photograph to try to understand the process of meaning making from their perspective.

A concern of the OUUK researchers was the use of images in a cultural and religious context that traditionally bans images; we took a critical stance to the 'uncritical transfer' of research ideas and approaches across different contexts (Barrett et al,

2011). Drawing on the teachings of Aniconism in the Quran, some Islamic scholars forbid the creation of images of sentient living beings. The display of photographs of people – especially women – is often frowned upon and the cost of printing copies of photographs is considered by some to be indulgent. Our experiences in schools in rural Sudan had suggested there were clear boundaries around who takes a photograph, who features in it, and who views it. We were concerned that these boundaries might inhibit teachers' use of the cameras.

However the OUS research committee were adamant that our intended use of photographs – particularly since the research was based in semi-urban schools - was acceptable. Indeed, we experienced no resistance to the project from participating teachers, head teachers or supervisors. The committee were more sceptical of the qualitative approach and the act of involving practitioners in data collection; only data collected by an academic, or someone with expert knowledge was perceived to be of value and initially they tried to persuade us to use the university's official photographer to take the pictures. Such 'fault lines' (Pryor et al, 2009:781) reflect differing assumptions about knowledge and whose knowledge is valued; such differences in epistemological understandings of practice help to explain the divide between theory and practice widely documented in teacher education in Sub Saharan Africa (Chisholm & Leyendecker, 2008).

4. Methods

Four government schools (two girls', one boys' and one co-educational) were selected, each with at least one teacher studying in the third year of the OUS BEd. The schools were representative of typical, semi-urban schools on the outskirts of Khartoum, with single storey classrooms built around a large tree-filled courtyard, large classrooms with desks and benches arranged in rows and limited electricity.

Class sizes in the schools averaged between 30-40 pupils. While Khartoum schools are not representative of all schools in Sudan - they tend to be better resourced and have higher attendance rates for example (Sudan Federal Ministry of Education, 2004) - colleagues at OUS chose these schools because the costs and logistics of travel were feasible in the budget and time-frame of the project. Schools and teachers were approached, informed and selected to participate in accordance with OUS ethics procedures which were adhered to throughout the study. Written consent was obtained from the head teachers and participating teachers following an introductory meeting with OUS researchers. Permission from parents was not deemed necessary by the OUS team.

Ten teachers (two male, eight female) participated in the study. Eight teachers were between the ages of 35 and 55 and had at least ten years of teaching experience, two teachers were in their 20s and had around five years of teaching experience.

Each teacher was given a disposable camera and basic training on how to use it. Disposable cameras were used because their purchase was more feasible within the project budget and we wanted to capture all of the photographs taken by the teachers. However, while the teachers were familiar with digital cameras and camera phones, using the disposable camera required a short session on how to wind the film on and operate the manual flash. Other studies emphasise the value of providing photography training, Moran and Tegano (2005:5) for example highlight key attributes of photojournalism including light, emphasis, motion/action, editing and the portrayal of time: 'When teachers understand and skilfully use these utilities they maximise the communicative and generative qualities of photography as a language of teacher inquiry'. While quality of image was not unimportant in our study it was decided that a focus on techniques would add to the teachers' already heavy workload and might limit their commitment to participate. In addition we were keen to

capture photographs that were 'in the moment'. Too much consideration about light or framing on behalf of the teacher may have caused these moments to be lost or edited for aesthetic reasons.

Over the following month the teachers were asked to be aware of moments in their teaching when they did something new or different in their practice and to document this with a photograph, asking someone else to hold the camera if they felt it was necessary that they themselves appeared in the photograph. At the end of the month the cameras were collected and films developed by the researchers.

A week later each teacher was invited, individually, to discuss their photographs with the researchers. Each discussion lasted approximately one hour and was conducted in Arabic and English with the help of an interpreter and recorded digitally. After introductory questions about the teacher's professional history, each teacher was asked to select three photographs from their set that were significant to them as teachers (see figure 1) and to talk about each of these three photographs. While this stage was essentially unstructured the teachers were guided towards describing activities in the image, why the image was important to them and its relevance to their teaching and for pupil learning. Discussions aimed to illuminate the process of understanding and experimenting with the classroom practices described in the handbook; the photographs creating a point of focus around which 'people negotiate what matters' whilst learning in practice (Wenger, 1998: 93).

Each teacher took between 8 and 25 photographs and a total of 134 photographs were developed. Back in the UK, the photographs were analysed in three stages. These three levels of analysis were carried out with the total set of photographs and with the sub- set of photographs selected by each teacher during the discussion. First they were sorted and coded for their content (who was in the picture, what

objects were featured, what appeared to be happening). The second stage looked for links to teaching strategies advocated in the OUS teachers' handbook (e.g. group work, taking pupils outside the classroom, use of local resources) and the third stage drew out any other common features across the photographs. The discussions were transcribed and coded to identify themes that resonated with those found in the photographs.

FIGURE 1 ABOUT HERE

We report briefly here on a limited number of themes to illustrate the nature of the evidence provided by the project.

5. The data – teachers' changing practices

5.1 Use of the local environment

Slightly over half of the photographs (74) were taken outside the classroom and this was a feature that teachers were keen to discuss - more than two thirds of the teacher-selected photographs came from this group. Of the photographs taken outside, 37 showed use of the natural environment within a lesson activity.

'I was teaching energy sources. The sun is an energy source so we went outside so they could see the light and heat of the sun... instead of a boring lecture I now deliver it differently.' (female teacher)

In the interviews teachers commented on how taking pupils outside the classroom for a lesson was a departure from normal practice, recognising that this shift to greater participation was not difficult:

'Instead of drawing a tree I now use a live example to show the parts of a tree. I honestly thought this was a waste of time before but now I realise that using real examples saves time, effort and money because I no longer have to find paper and draw the diagram.' (male teacher)

Teachers identified several benefits from using the local environment as a teaching space and resource - pupils found lessons more interesting and easier to understand and both teachers and pupils relished the change from the crowded classroom. This remark from a female teacher was typical: 'my teaching is becoming more practical in all ways, see here the students are learning how to plant a tree and how it grows'. Such changes were reported as enhancing pupil learning '...this has had a very good effect on the pupils. They have moved from only gaining knowledge from written forms to a practical way of gaining knowledge' (male teacher). One teacher commented that outside the classroom she was able to identify more clearly which pupils were finding it hard to understand and go over key points with them without holding up the rest of the class. Being outside enabled her to walk among the pupils, something the crowded rows of the classroom prevented. Another teacher described how moving lessons outside had strengthened her relationship with her class, she had noticed that pupils felt more comfortable asking her questions when they were all grouped informally around a tree (for example) than when they were sitting in rows and she was standing at the front.

5.2 Use of small group work

One strategy in the OUS handbook involves re-arranging seating in the classroom to facilitate small group working and pupil interaction. This is logistically challenging with large classes and where pupils sit on long metal benches which are often welded to the desks. However, 33 photographs from the total set showed pupils working in groups, either standing around a desk, seated at two desks placed front-to-front or,

less commonly, pupils working in groups on the veranda or in the compound (see figure 2).

FIGURE 2 ABOUT HERE

Discussions revealed that use of group work was not new for these teachers but the handbook appeared to have given the teachers new impetus and rationale for using groups:

‘In the past I just used to use group work to help them memorise times tables... now they work in groups more often they are closer, they see that they can learn from each other and not just from me.’ (male teacher).

Teachers commented particularly on how they noticed the shy and more introverted pupils speaking more confidently when working in small groups. One teacher highlighted how she felt that group work had ‘laid some of the burden of teaching off my shoulders.’ As with taking the pupils outside, changes in the layout/geography of the teaching environment enabled the teachers to feel more aware of the pace of individual learning. This teacher felt that when the pupils worked in groups she was able to move among them, listen to their discussions and contribute/intervene where necessary. One of the male teachers justified his choice of three images of group work: ‘this group participation teaches them the kind of behaviours that will help them with their professional careers in the future’. This commitment to group interaction was driven partly by the pupils: ‘it has made them more eager to receive education’.

5.3 Pupil contribution to lesson

As expected the majority of photograph featured pupils, engaged in a variety of activities. However several teachers wished to foreground, through the photographs,

ways in which pupils contributed to the collective learning of the class for example individual pupils, often at the front of the class, leading discussion with other pupils, explaining a concept or working through an example; .

“It’s a way of building self-confidence into the students. If the student is asking the question she will try very hard to understand the answer before she asks another student. Then the other girls feel less intimidated answering a student rather than a teacher. It also helps me to know better what they do and don’t understand rather than just assuming. It helps me to see how the students learn”. (Female teacher)

Further examples show pupils reporting back to the class after undertaking research in small groups and pupils leading ‘brainstorming’ sessions. Through the interviews teachers described how such use of such strategies was enabling them to gain a more in-depth understanding of the progress of pupil learning – assessment for learning, and to plan learning episodes more effectively. Such techniques were noted to improve pupil interest and confidence, as one teacher remarked, ‘because when they see that one of their peers has got up and done a few examples then they have more confidence to get up and do the rest and they view themselves as teachers in this way.’ Another commented ‘... in this way they [students] are able to express the aspects of their knowledge they feel are important’. Such reflections and thoughtful adaptive use of the ideas in the handbook are indicative of the changing practices in these teachers’ classrooms as they begin to view their pupils as knowledgeable and agentive.

5.4 Beyond formal lessons

Surprising to us was that all but three of the teachers took photographs of scenes that occurred outside formal lessons (17 photographs in total):

‘This is assembly time. I was giving a lecture about looking after the school environment. The boys are cleaning the water pots... I usually just lecture in

assembly but I thought I would use real examples so I selected some students to demonstrate... it was more interesting for the students... my use of real life examples is spreading outside the classroom' (male teacher).

'This is not a lesson, it is a science club... they are now doing things that are less boring and more exciting, now I am using practicals outside of my classroom teaching. I am becoming a more practical teacher in everything I do' (female teacher)

In another interview the female teacher discussed a photo that showed 'one student doing her homework and the other student discussing the same homework with her, this working in groups for homework is new'. Such photographs suggest the influence of the handbook ideas about how pupils learn, has not been restricted to formal lessons. Interestingly only one teacher selected one of these photographs (the others were identified by the researchers and raised in the discussion). Some teachers were reluctant to discuss these photographs because they didn't show 'proper teaching' – we assume these scenarios had not been set up by the teachers otherwise they would have been more enthusiastic to discuss them, but other teachers explained how their views of teaching were shifting: 'my view of good teaching has changed into one that thinks that good teaching involves interactions with local society'.

6. Insights into teacher development

It is difficult to draw firm conclusions from such a small scale pilot study but there is some evidence to suggest that reflective photography has the potential to begin to expose insights into mechanisms of change in teachers' practices and thinking that may not easily be visible through other methods. It foregrounds teachers' view of their own practice, offering them a space to explain why teachers they behave as they do and where they find space for change (Johnson et al, 2000).

The photographs reveal an enlarged or extended view of a teacher's role and identity, extending beyond the formal classroom to other teacher activities. One teacher asked a colleague to take a photograph of him planning his lessons - he felt he had started giving more attention to this activity. Another photograph showed a teacher consulting her pupils about the lesson plan – drawing on their experiences of the previous lesson to find out what they had learned and which approaches they had found the most interesting.

'The picture shows me sitting down preparing for the class and there are two students helping me to prepare for the class. I was very excited that there were two students taking part in the preparation for the class. I asked them to point out what parts of the lesson they like best and they chose the ones that included activities... I think that involving the students in the preparation is an important change because it shows me what the students' preferences are so that I can find better ways to get the information across' (female teacher).

Such moments that were unlikely to be captured in traditional lesson observations or discussed in subsequent feedback and reflection.

The photographs offered the teacher the opportunity to explain moments in their practices with meaning for their deepening participation in practice. For example 14 photographs show the teacher standing at the blackboard and eleven photographs show pupils sitting passively in rows; it was not immediately obvious to us why these activities had been photographed. Subsequent discussion revealed that the seating arrangements of the pupils had been modified, they were now in mixed ability rows, explained as facilitating greater involvement from all pupils including those with less confidence. Another photograph showed a male teacher standing at the front of the classroom, apparently lecturing. But discussion revealed:

'I am encouraging the pupils to be more interactive. I ask more questions – both easy and hard – and more are putting their hands up to answer. In the past they didn't used to – their participation was dull' (male teacher).

He expanded further to explain 'I have increased the interaction between the teacher and the student and made them interact with each other as well'. The other male teacher explained how the use of the handbook helped him to 'understand how students feel and how important it is not to make students feel weaker by pointing out what they don't know but making them feel stronger and making them feel they can achieve anything'. The teacher education programme has driven pedagogic change in this teacher's classroom, his discourse of learning and positioning of his pupils has fundamentally shifted.

We argue that to expect a sudden and complete shift in teachers' practices in any training programme is unrealistic and likely to be unsustainable. But small shifts that are enacted in the context of current practices – what Grossman et al (2009) term the 'warp' of teaching - are crucial in helping teachers to move forwards and were made visible through the reflective photography process. It also allowed teachers to share personal moments of success in their teaching. In some instances these were highly explicit; one teacher, for example, took a photograph of his pupils applauding because a demonstration had been accomplished effectively:

'The pupils applauded. There was evident happiness on their faces and that showed that they really liked the new way of teaching' (male teacher).

Another teacher selected a photograph of the pupils working in groups because she wanted to show how much they were smiling, cooperating with each other and

enjoying the work. A tendency to focus on student enjoyment and the alleviation of boredom as an indicator of teaching success rather than student learning was a recurrent theme in our data. These incidents of success, measured through pupil response and behaviour, offer an insight into the teachers' motivation for selecting certain teaching strategies; they prioritise and develop those strategies which offer short term affirmation through pupil engagement and behaviour (Kitching et al, 2009; Guskey, 2000). A female teacher, for, example, stressed that she would continue to use group work 'because it makes the students' comprehension higher because they learn from each other as well'.

Changing teaching behaviour is not easy; it involves risk (Loughran, 2010) and an environment that allows the change to be enacted. New ideas will be rejected and not repeated if 'they do not fit the environment' (Johnson et al, 2000). Reflective photography allowed us to see the critical role of the environment – or local context, the interactions of teachers' practices with their environment and how this facilitates or restricts practice. We observed teachers taking risks in the environment of school clubs, assemblies and outside the classroom; spaces where we suggest the cultural expectations around activity format and behaviours are less entrenched than in the school classroom. Such spaces afforded fewer physical constraints to teacher and pupil movement but also hold lower expectations of 'proper' ways of working. Through the photographs and subsequent discussions we were able to identify which strategies were the most challenging in the teachers' classrooms and, therefore, predict which would likely to lead to sustainable change.

6.1 Enhancing the insights

This was a small-scale pilot study intended to explore the usefulness of the reflective photography approach in understanding teachers' developing practice. Reflecting on the experience we identified ways to enhance the value of the process.

Time is often a key restraint in cross-cultural research (Pryor et al, 2009) and, for us, time constraints challenged our aspirations of a truly collaborative approach. Co-location of the two groups of researchers was highly limited and there were cultural differences in prioritising use of available time. Sporadic internet access at OUS restricted communication and limited the richness of analysis.

A key challenge in this cross-cultural collaboration was language: school discussions involved each teacher individually, with members of the OUS and OUUK research teams and interpreter. This set-up, which was intended to be informal, actually led to very formal, highly restricted exchanges. Employment of an interpreter inserts a layer of complexity into the research; his gender, status and limited familiarity with issues of classroom teaching all influenced discussions (Wangui, 2012). In addition there were only very rare examples of teachers using a cognitive lens to analyse the teaching and learning process, most were descriptive relying on lay theories (Marcos et al, 2008). This is a finding common with teacher journals (Otienoh, 2010) and is not surprising these teachers have received only a little or no training in developing skills of reflection through their BEd.

Arguably peer group discussion of the photographs may have lead to greater analysis. Lemon (2007) highlights studies that suggest how reflective practice 'seeks to engage teachers with one another in thinking about the purposes and consequences of their work' (p.181). The opportunity to facilitate this shared engagement *between* the teachers was missed in this study (Musanti & Pence, 2010).

Finally in using this method again we would place less emphasis on the permanence and product nature of the photograph; teachers wanted to discuss the photos which

they perceived as 'good' rather than those which had more relevance to their practice. The main value of this method is the process, the opportunity to explore with teachers what is happening in their classrooms at particular moments rather than capturing their classrooms in an attractive image.

7. Conclusions

The upgrading programme aimed to improve teachers' practices through use of more active participatory classroom methods. In initiatives from different contexts teachers are often observed to find it difficult to engage with new practices (Clift & Brady, 2005) or to be taking up the 'form rather than the spirit and content' of these new practices (Chisholm et al 2000 quoted in Brodie et al 2002; Altinyelken, 2012)

However our photographs and discussions lead us to suggest that reality is more complex and untidy and that, rather than judging teachers against predefined patterns of practice, much can be learnt from trying to understand teachers own learning trajectories holistically within the school arena (Rozelle & Wilson, 2012) In this study much everyday practice showed only modest development but deeper analysis of the photographic data reveals teachers finding safe spaces to begin to embrace a pedagogy which positions learners as knowledgeable and agentive and which connects classroom learning to learning and social practices outside school. We see teachers experimenting with more participatory methods 'outside' the classroom – both in physical spaces beyond the boundaries of the classroom walls and in temporal spaces separate from lessons such as lunchtimes. Such 'off stage' observations are difficult to document without engaging in resource intensive shadowing, which in the context of Sudan involves added outsider complexities.

The use of reflective photograph begins to offer us a glimpse of the mechanisms by which teachers engage in new practices. Framing teachers' work is an 'understanding and positioning of themselves as a product of their professional identity' (Mokler, 2011, p 517); professional identity is central to effecting change in their own classrooms. Teachers' decision-making and actions are affected by their knowledge about themselves, their interpretations of who and how they are as teachers; they bring pre-existing knowledge and identities to activity within their context. But the actions associated with the professional development endeavour involve uncertainty and the possibility of failure so, we suggest, teachers will be more likely to engage with change if it is perceived to pose only a limited threat to their conceptions of who they are as teachers and the roles they are supported to play; any change must be perceived as posing only a limited risk to their professional identity. We suggest the teachers in this study were navigating changes to their identity through playing out their own expression of themselves as teachers in accord with their own moral purpose in the context of their own communities but without contesting too deeply commonly held views on their role – 'what they do' in the classroom. These 'safe' opportunities to enact different practices were beginning to influence what the teachers' come to believe about successful teaching behaviours and competences. The challenge for teacher educators is to encourage and facilitate the transposition of these experiences into the formal classroom as legitimate practices, forging a developmental path for teachers(Valencia et al, 2009). Driving pedagogical change in schools through teacher education programmes, such as this upgrading programme, thus requires consideration of a number of factors in its design. Buy-in from local stakeholders matters so that teachers are not expected to behave in ways which are immediately in conflict with the expectations of pupils, parents, head teachers and other members of their community. Teachers need to become members of a community of learners to extend the changes in practice across the school. Teacher educators, such as supervisors, can play a pivotal role

here in brokering the formation and support for such communities, engaging with teachers beyond those on the upgrading programme so that ongoing experimentation and learning is seen as an attribute of being a professional. Another key consideration is the physical environment, in particular the constraints of the classroom and its furniture. And a long term view is needed to allow for sustainable change; teachers need time to explore in ways which do not immediately threaten their identities or too abruptly disrupt their relationships with pupils. For teachers the time and commitment required to shift pedagogy is repaid through the increased participation and motivation of their pupils, exam evidence will sustain this engagement.

What is absent in many other studies of teacher change and development, especially in Sub-Saharan Africa, is the perspective of the teachers themselves and their perceptions of their development as teachers. Reflective photography offers an opportunity to perceive the classroom from the viewpoint of the people who are shaping the classroom, it gives agency to the teachers and enables them to share their experiences based on images that represent their reality. Entering into such a discourse with the teacher as learner, we suggest, helps us to identify ways to more fully support teachers, and understand their developing identities as they move deeper into practice. This observational data offers us a window into nuances of interactions, teachers' interpretations and choices (Graziano & Litton, 2007). Personal and professional change can be seen through the capturing of 'moments' and subsequent discussion of these 'moments'. Teachers' engagement with unfamiliar practices is intense, messy, long term and non-linear: reflective photography has the potential to help teacher educators and teachers to map this journey.

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