Audiovision for Training Teachers of Nigerian Nomadic Children

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Abstract: In 2012 in Africa, access to the Internet was 26%, and 622 million people had no access to electricity. Yet there are very few low-tech initiatives aimed at bridging this E-learning divide. One such initiative, for Nigeria, was funded by the Commonwealth of Learning in 2011/12: in-service teacher training through Audiovision (visual materials, in a booklet, are customised to integrate with audio commentary). Six audiovision packages were designed and produced in 2011, and delivered to in-service teachers in six workshops in February March, 2012. In each audio recording, the Audio Tutor (the narrator in the recording) introduces recorded parts of a Primary school lesson conducted by a master school teacher. Listeners are directed to view visual materials related to each part of the lesson. These materials consist of individual frames (similar to PowerPoint slides), of three types, (1) copies of the master school teacher's teaching aids and blackboard work; (2) the master school teacher's teaching techniques; (3) how the techniques help the pupils learn. The audio tutor invites the in-service teachers to reflect on the rationale for each teaching technique, as outlined in frames of type 2, then gives his/her own opinion of the rationale, outlined in the frames of type 3. The audiovision packages are truly composite, consisting of audio and visual materials reinforcing each other. This paper elaborates the many innovative design principles that are required for such packages to be pedagogically effective. The pre-penultimate section compares Audiovision with three other audiovisual technologies: PowerPoint, Interactive Multimedia Learning Objects Online and Interactive Radio Instruction (IRI) and posits some advantages of Audiovision over IRI for teacher training. The paper concludes with two sections that summarise some lessons learned by the production team during the project – how to be more efficient and effective in the design and production of the materials and the workshops.

Keywords: teacher training, composite medium, audio plus print materials, audio-image synergy, design principles.

Introduction

According to Internet World Stats (June 2014), access to the Internet worldwide in 2012 was 42% (26.5% in Africa). In addition, the International Energy Agency (2014) found there were 1.3 billion people without access to electricity, 622 million of these in Africa. Yet there are very few low-tech initiatives aimed at bridging this E-learning divide.

One such initiative was funded by the Commonwealth of Learning (COL) in 2011/12 for the state of Adamawa, Nigeria: the use of *audiovision* for in-service training of teachers of nomadic children. This was one of many projects of the UNICEF-COL Child Friendly Schools Initiative, covering eight African countries (Commonwealth of Learning, 2012). Teachers' methods in the nomadic schools of Adamawa invariably followed the teacher-centered style of previous centuries. The *audiovision* training project aimed to arouse nomadic teachers to the benefits of constructivist, child-friendly methods, whereby children are encouraged to be active, cooperative learners, constructing their learning through the interaction of new information with their existing individual and community knowledge, and in which teachers are friendly and considerate of the rights and wellbeing of all children.

Audiovision is a term coined by the UK Open University in the 1970s (Rowntree, 1994). It is a com-

posite medium in which visual materials are customised to integrate with audio commentary. This medium was highly rated by UK OU students, more so than TV broadcasts (Grundin, 1980). The visual images were on paper and the audiotrack was on audiocassette (Koumi, 1994). Since 1997, audiovision began to be superseded by interactive multimedia (now delivered mostly online), in which the audio is synchronised with the images.

However, the potential of the original *low-tech* audiovision is still enormous, underestimated the world over. There are just two infrastructure requirements for access. Firstly, a postal system to deliver CDs or audiocassettes and accompanying visuals in a *Radio/Audio Booklet*; secondly, each user-group needs an audio (CD/cassette) player.

Teaching Functions for Which Audiovision is Particularly Appropriate

The following audiovision teaching functions are those that are specifically appropriate for learning about child-friendly, constructivist teaching methodology – abstracted from the list that applies to learning in general, Koumi (2006, p.181).

First, it might be thought that *video recordings* of classroom teaching would need to be viewed by in-service teachers. Indeed such video has frequently been provided in other teacher-training projects, for example in the Learning Schools Programme in the UK (Banks, 2001) and in Vietnamese Primary Teacher Training (Koumi, 2008). However, much of the source material that in-service teachers need to study are sound recordings of a teacher and pupils in class, together with photographs of visual aids and blackboard work presented to the pupils by the classroom teacher.

Secondly, classroom techniques and methodology can be described by a narrator who guides listeners through static printed images, such as diagrams of classroom desk placement or charts comparing different group-work methods.

Thirdly, any interspersed activities that are substantial need to be specified in printed form, as well as being discussed by the narrator.

Finally, the narrator's discussion of the topic (e.g. in an introduction or summary) can often benefit from printed key words, to anchor attention and prevent overloading auditory memory.

These four elements were indeed provided by audiovision packages to the nomadic in-service teachers of Adamawa State. Other elements of the training and the way they were produced are described below.

The Nature of the Materials Designed for Nomadic Teacher Training

Appropriate infrastructure for delivering audio-vision is available in Adamawa, Nigeria. So, the composite medium was used there, to train teachers of nomadic children.

The project entailed 35 days of face-to-face consultancy, in five visits by this author to the Federal College of Education (FCE) in Yola, plus 120 hours through email. On site, the work involved full-day consultations with an eight-person project team (3 FCE education lecturers, three radio producers, two staff of the Adamawa State Universal Basic Education Board). Some consultations included eight other Teacher Educators of FCE, who were to be mentors in the eventual in-service workshops. On a few occasions, we consulted with staff from three nomadic schools in the Yola district, and we also visited these schools. Many consultations included Dr Chika Enueme, a Nigerian expert on Child Friendly Schools.

Six audiovision packages on constructivist and child-friendly methodologies were designed and produced in 2011, and delivered to in-service teachers in six workshops in February – March, 2012. The teachers travelled to the nearest of four workshop venues. The workshops were mentored by the eight FCE Teacher Educators, two per venue. Mentors were guided by a booklet that had been produced by the project team. The packages were later delivered to new teachers in another six workshops in April May, 2012.

The teachers listened twice: once to a live radio broadcast, then to a CD recording. In the final phase of each workshop, each in-service teacher enacted one of the classroom methodologies described in the package, with the other teachers role-playing as children.

In each audio recording, the *audio tutor* (the narrator in the recording) introduces recorded parts of a constructivist, child-friendly Primary School lesson, conducted by a *master school teacher*. The audio tutor directs the listeners to view the visual materials related to each part of the lesson.

The printed visual materials consist of individual *frames* (like PowerPoint slides), of three types:

1. Frames with copies of the teaching aids and the blackboard chalking that the master school teacher is displaying in the recorded lesson. The listeners can therefore see what the pupils are looking at,

2. Frames that outline the teaching techniques being used by the master school teacher, and

3. Frames that outline the rationale of the techniques – how they help pupils learn.

The narrator invites the in-service teachers to reflect on the rationale for each teaching technique, as outlined in frames of type 2, then gives his/her own opinion of the rationale, outlined in type 3 frames.

The audiovision project provided the in-service teachers with a record of the concepts in the form of the Radio/Audio Booklet, comprising the Study Guide and the six sets of frames, one for each radio broadcast. In future this booklet will serve to refresh teachers' memories of the techniques and their rationale. Also, each school will have CD and audiocassette copies. An additional aid, listed at the end of the frames for each of the six learning packages, is the set of Learning Objectives for each package, namely that teachers should be able to demonstrate that they understand the purpose (type 3 frames) and be able to implement the techniques (type 2 frames).

But now for the most important feature of the project: for audiovision packages to be pedagogically effective, their design is far from trivial.

Design Principles for Audiovision

Forty design principles will be described in detail below. These summarise the principles in Koumi (2006, Chapter 7), developed between 1972 and 1992 by UK OU Course Teams. The teams consisted of OU faculty members and BBC producers, including this author. The 40 principles also overlap with 13 principles discussed by Rowntree (1994, pp. 80-81) and with design guidelines for interactive multimedia, discussed by Koumi (2013).

The 40 principles are distributed among nine categories:

1. Navigational guidance and student control

2. Use of language

3. Layout of frames

4. Relationship of text to commentary

5. The speaker should be like a personal tutor, at the learner's shoulder

6. Visuals and audio should reinforce each other

7. Interactive elements

8. Educational story-telling

9. Conclusion: draft and re-draft

Navigational guidance and student control (Rowntree, 1994, p.80)

1. Supply a Study Guide at the beginning of the Radio/Audio Booklet, describing the learning materials and how they are intended to be used.

2. Specify in an announcement at the start of the radio broadcast (or audio CD/cassette) which printed materials to look at. Conversely, the printed materials should identify the relevant CD/cassette.

In our project, the announcement always started with the following paragraph.

> This is an instructional *Audiovision* episode. It is specially made for teachers in nomadic schools. We want to introduce you to *Constructivist* teaching methodology in a *Child Friendly School* atmosphere. This means delivering an activity driven lesson, by a teacher who is friendly to the children and considers the rights and wellbeing of *all* children irrespective of their gender, family background, ability and/or disability.

This paragraph was followed by a short description of the lesson. For example,

> We are going to use a composition lesson for primary 3 pupils to show how we can help the shy child to be more active in the class.

Finally the announcer identified the printed material that listeners needed to look at. In this case:

> Participating nomadic teachers will need to refer to section 4 of the Radio Booklet.

3. Give each *frame* a number and quote the number to direct listeners' attention to that frame.

4. Give each frame a title to help students to navigate if they want to skim through later.

Use of language (Koumi, 2013, pp. 93-94)

5. Listeners find it easier to understand short sentences because (a) a long sentence can exceed the listener's memory span, (b) long sentences normally contain conditional clauses, which are difficult to bear in mind. So you should convert every long sentence into two or more short ones.

6. Avoid using words that are difficult to say or to hear. One example is when the last consonant of a word is the same as the first consonant of the next word. This happens twice in the phrase:

> *The last task of the seventh theme ... .*

7. The narration is audio not print, so write for the ear, not the eye. That is, write *conversational* speech, to be spoken and listened to, *not* to be read. One way
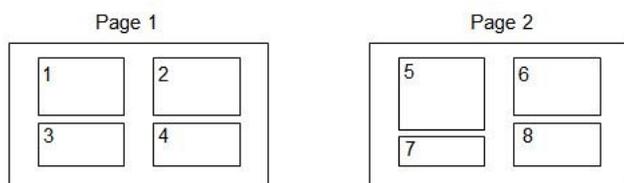
Figure 1. Two pages of frames in landscape format.

to achieve this is: First make a draft of the visuals (the frames), then talk about these visuals straight into an audio recording device – and transcribe your recording to produce your first draft script.

Layout of frames (Koumi, 2006, p. 186)

8. The layout of frames should be easy for the eye to follow while listening. So you should design uncluttered, sparse layout – because students cannot easily process dense visual layout while listening to commentary. For text in particular, use only about 25 per cent of normal print density.

9. Some writers use landscape layout for the frames, as shown in Figure 1. This enables four frames per page (rather than two, which is suitable on a portrait layout), making it easier for students to switch attention between nearby frames.

10. If a segment requires more than four frames, and if students would be required to look back and forth, you could cover the argument in eight frames, positioned on facing pages, as in Figure 1.

Relationship of text to narration (Koumi, 2006, pp. 186-188)

11. Succinct items of explanatory text (not much more than *key words*):

- *reinforce* the narration (especially if the narrator stresses the key words, as recommended below),
- serve as visual mnemonics to avoid overloading auditory memory: the spoken words do not need to be retained in memory if they have been précised by a key word or two,
- serve to anchor attention and prevent the learner's mind from wandering.

This type of visual material, as well as diagrams, is what widens the scope of audio – enables the teaching of more topics in more detail, at greater depth.

12. But you can have too much text. Kalyuga (2000) reports many multimedia packages in which the text duplicates the commentary. This is likely to have a negative effect, because students typically read at a faster pace than the narrator is speaking.

Estimates of reading and speaking speed vary, but if you are speaking in the students' mother-tongue, your speaking speed (for comfortable listening as well as comfortable vocalisation) would be about 160 words per minute (Williams, 1998), whereas the students' reading speed will be about 250 words per minute (Ziefle, 1998). Such a difference in the pace of reading compared to narration, necessitating asynchronous processing, would result in phonological and semantic interference. This interference can be largely avoided if the text is a judicious précis of the audio commentary, not a duplicate.

13. When the audio narration is précised by text, students will search the text in order to track what they are hearing. To facilitate this tracking, the text should *reproduce key words* of the narration rather than *paraphrasing* the narration. So if the text reads, *basic ideas*, the narration should include the same words, *basic ideas*, rather than paraphrasing them into (say) *fundamental notions*.

14. The narrator's tone of voice can help students' track what they are hearing by *stressing* the key words. The speaker would know which words to stress if they are typed in bold font in the script.

15. Formative evaluation during rehearsal and recording can help to phrase the text so that it anchors and reinforces the audio commentary rather than interfering with it. Many ad hoc refinements can be made through a colleague adopting the role of the learner during rehearsal and recording.

16. You can achieve a full outline of the topic with an economic amount of text. This is because the text gains new meaning once students have listened to the audio commentary; so when they look at the frames later, they will recall much of the extra meaning that was supplied by the commentary.

17. A reasonable average for frequency of frames is 15 frames per 20 minutes of audio.

18. If the audio is listened to on a CD rather than on radio, the duration of pauses can be chosen by the students rather than be pre-determined. This makes CD a more powerful teaching medium because the student activities can be much deeper.

The main speaker should be like a personal tutor, at the learner's shoulder (Koumi, 2006, pp. 188-189)

19. For the announcement that tells students about pre-work and about which visuals to use (principle 2), you could use a different speaker with a matter-of-fact, administrative tone. This frees the main narrator to be informal from the outset, taking the role of a friendly personal tutor. A sensation that the narrator is looking over the learner's shoulder at the vis-

uals is heightened when the text *reproduces key words* that are stressed by the narrator (as recommended in principle 14).

20. The production may have been a team effort, but in order to be personal, the speaker had better take sole credit as the individual author. That is, say **I** rather than **we**. Also, address the listener in the singular, as **you,** not as **some of you**.

The visuals and the audio should reinforce each other (Koumi, 2013, pp. 97-99)

21. Make teaching points about a visual when they are looking at it, and not in a wordy introduction while they are looking at the previous visual. In fact, sometimes, looking at images should precede listening to the narration, e.g. when the images are mathematical expressions that are difficult to listen to unless they can be seen. For example the commentary,

> *minus b, plus or minus the square root of, b -squared minus four ac, all over two a*

is impossible for most students to appreciate unless they are first shown the algebraic formula

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

22. Give students enough time to digest the visuals. For example, include sufficient pause in the commentary for students' eyes to settle on a new frame before commenting on it.

23. When moving from one idea to the next, while still on the same frame, create a vertical *gap* in the spacing of the graphics and a *matching pause* in the spoken commentary.

24. Give clear guidance about what to do and where to look. If the frames are well designed, the layout should lead the student's eyes naturally to each item. However, occasionally, you may need to direct their gaze by saying *…at the top of the frame…* or *…in the table…*

Interactive elements – how to refer to activities in advance (Daniels & Koumi, 1992, pp. 17-18)

25. Insert 10-second musical jingles for activities by the listeners. But if they are listening to a CD, tell them that the jingle invites them to pause the recording and spend a longer time for these activities.

> In all six of our lessons, the narrator invited listeners to pause just before the jingle. We felt that verbal repetition was necessary, considering that the listeners had

never before studied in this way. However, Kern and Mason (1977) feel that such jingles are sufficient without any verbal instruction, stating, "*we use a musical jingle which is much preferred to verbal or electronic signals. A single instruction is easily ignored, but not a jingle*."

26. For listeners to gain the most from the reflective activities specified in frames of Type 2, they should be dissuaded from looking at the "answer-frames" (frames of Type 3) before making a substantial effort. Hence Type 3 frames had better be positioned on a new page of the booklet (see Figure 2).

27. The invited activities should be summarised by the narrator, as well as being specified in detail in printed form (in frames of type 2). Thereby, the speaker gives an impression of being at the learner's shoulder.

Interactive elements – after they have tackled the activity

28. The document that students use for revision will include their own annotations, made during the interspersed activities. Hence it is preferable that students should annotate the document rather than use a separate piece of paper. So leave space in the frame for students to write their answers. The resulting narrative has been *co-authored* by the package and the student. (Koumi, 2006, p. 211).

29. Remind students what they should have just done during a CD/cassette-stop (Daniels & Koumi, 1992, p. 18). You can never tell when they will re-start the CD: it may be two days later. For example, after a stop jingle, do not merely say

> *You should now be able to*

Instead say

> **If you have calculated the values in Table 2, you should now be able to …**

Interactive elements – number of CD-pauses

30. Avoid trivial activities that students would not perceive as significant for their learning. Self - confidence will increase (which will help their later accomplishments) through experiencing success, not at trivial activities but rather at challenging tasks. Driscoll (2000, p.329), suggests that the teacher (in our case the audiovision package) should give just enough assistance to perform tasks students are not quite capable of performing on their own.

31. Even when activities are weighty enough to be perceived as useful, too frequent CD-pauses could irritate students. In general, the interspersed audio narration should be more than three paragraphs.

32. **Interactivity** *on the run* (Daniels & Koumi, 1992, p. 17)**.** Relating to the previous guideline that there should not be too many stops and starts, **some** interaction should be encouraged 'on the run' so as to facilitate cognitive engagement, e.g. by including short pauses for contemplation, encouraging prediction.

Facilitate/encourage constructive learning (Koumi, 2006, pp.147-152).

33. Spoken words should not be a literal duplication of the visuals, because you want to encourage students to make the picture-word connection for themselves (see Figure 2).

34. Concretize: that is, relate to (hence *activate*) students' previous knowledge.

35. Support/Scaffold the learner's construction of knowledge, e.g. proceed from concrete to abstract and from simple to complex.

Educational story-telling (judiciously balance *effective exposition* by the teacher, against *independent exploration* by the student)

The efficacy (even the necessity) of narrative structure has been proposed by many writers, such as Gudmundsdottir (1995), Gibson (1996), and Laurillard et al. (2000). The guidelines below are adapted from the video design principles in Chapter 5 and 6 of Koumi (2006).

36. *Hook:* (capture and sustain attention): e.g. capture attention with the unexpected; sustain attention by creating suspense.

37. *Signpost:* clearly indicate where the story is going, what is happening next, what to look out for.

38. *Elucidate:* moderate the breadth, pace and depth, maximize clarity

    Regarding breadth, pace and depth, do not overload students with too broad a coverage (too many teaching points) or too fast a pace, or too much intellectual depth. The appropriate breadth, pace and depth depends on the level and prior knowledge of the students.

39. *Reinforce:* Give more than one example of a concept, use *comparison* and *contrast*, ensure *synergy* between visuals and audio.

In our project, following the radio broadcast, the workshop mentor has guided the in-service teachers through a repeat of the package, using a CD copy. Then, in a final stage, contrived to reinforce and embed the learning: **each in-service teacher was invited to enact one of the methodologies** described in the package, with the other teachers role-playing as children.

Conclusion: draft and re-draft

40. Given all the above, it should be clear that you could not design a perfect image-word package with your first draft – you need several draft designs and script discussions .

The Composite Nature of the Materials

From Figure 2 it can be seen that the audio instructions are accompanied by visual materials in a booklet, to which listeners will refer, throughout the audio programme. As the audio progresses, the Narrator/Tutor tells listeners which parts of the visual materials they should look at**.**

Hence the medium being used is truly composite, in which audio and visual materials reinforce each other. Both are needed for full understanding. The frames of type 2 and 3 (C1 and C2 in Figure 2) contain succinct phrases of explanatory text that reinforce the narration and serve as mnemonics to avoid overloading auditory memory. Key words and phrases also anchor attention.

This type of visual material (frames of type 2 and 3), as well as diagrams of teaching aids and blackboard work (frames A and B in Figure 2), is what widens the scope of audio – enables the teaching of *more topics* in *more detail*, at *greater depth***.**

Comparison with Three Other Audiovisual Technologies

PowerPoint, Interactive Multimedia Learning Objects and Interactive Radio Instruction (IRI) are three audio-visual technologies that need to be distinguished from the above *audiovision*. The distinction is necessary because it might be thought that the former three technologies could accomplish comparable teacher training. However, audiovision has comparative advantages over all three that will be discussed one at a time below.

PowerPoint

Most of the above *audiovision* design principles would apply to the design of pedagogically effective PowerPoint presentations. However there are three main differences.

Firstly, the printed frames of an audiovision package, unlike PowerPoint slides, can be viewed in

any order chosen by the learner, with quick switching between different/multiple frames.

Secondly, in audiovision, several related frames can be placed on a single page (and even on two facing pages, as in principle 9), making it easier for students to switch attention between nearby frames.

Thirdly, the sizes and aspect ratios of frames can be varied, as seen in Figure 2 (the frames are different in size, and some are square, others landscape, others portrait), hence enabling flexibility for what and how much to put into each Frame. Admittedly, PowerPoint 2013 enables the production of slides with custom aspect ratios, so can be used to produce and print frames of varied aspect ratios. However, if PowerPoint is being used to produce a presentation rather than images for printing, it is not possible to mix aspect ratios of slides during a single PowerPoint presentation.

Interactive Multimedia Learning Objects (online or on DVD or USB sticks)

Most of the audiovision design principles would apply to the design of pedagogically effective multimedia presentations, involving both static and animated diagrams (and even video clips), in which the narration is synchronised with the succession of images. Such provision of moving images can certainly add considerable value to learning, as argued by Koumi (2013), who proposed a framework of multimedia design guidelines that achieve synergy between images, narration and key-word text. Mayer (2005) also proposes 12 *multimedia principles*. However, although Mayer's principles have been empirically tested, they are pitched at a general, imprecise level, rather than the detailed practical level of the above 40 audiovision design principles. Koumi (2013) takes issue with some of the experimental designs supporting Mayer's principles and contends that all the principles "are pitched at a rudimentary level that only skims the surface of the *detailed* design concerns of the practitioner" (p. 108).

At any rate, if static images are sufficient for the learning task , Audiovision, where narration is decoupled from the printed frames, gives control to the learner as to when and which image to view, which is a powerful learner-centred advantage.

But note that audiovision can be simulated online, with multimedia resources consisting of static images and audio commentary – by *decoupling* the audio and images, allowing learners to choose when and which image to view. Moreover, a multimedia lesson can better cater to individual differences when it is truly *interactive*, e.g. different levels of help are provided depending on students' inputs into a dialogue box.

Nevertheless, see principles 9 and 10 concerning two facing pages of frames. Cross-referencing online

between eight frames-worth of information would not be possible – that much information would be illegible on a single screen. Hence audiovision (with images on paper) is better suited than interactive multimedia for tasks that require comparison and analysis of large quantities of information.

Interactive Radio Instruction

There have been dozens of programmes using Interactive Radio Instruction (IRI) in Africa. IRI guides the teacher or facilitator and the students through activities, games, and exercises that teach specific subject matter. Teachers and students participate throughout the programmes, during pauses that are built into the design of the radio scripts. The pauses typically vary between 3 and 10 seconds (World Bank Development Research Group, 2005). In some cases, student workbooks, posters, and wall friezes are provided to support and enhance the learning.

Developers of IRI claim that the method helps teacher training because it models how to organize effective learning activities (Bosch, 2010). However, the strength of this claim is contested below.

The advantages of Audiovision over IRI

Unlike IRI, audiovision materials take the form of a truly composite medium, as described above, in which the printed materials are central to the instruction and need to be scrutinized continuously throughout the audio presentation. Hence the visual and auditory modalities are employed in parallel, which is how their synergy comes to pass – how and why the visuals and audio reinforce each other. As argued above, the use of complementary visual material is what widens the scope of audio – enables the coverage of more topics, in more detail, at greater depth.

Secondly, our audiovision materials are addressed exclusively at teachers, unlike IRI, which is addressed at pupils. (When IRI does occasionally address the teachers, it is to instruct them how to facilitate the radio instruction). The reason that our materials address teachers exclusively is that the audio programmes are not classroom lessons to be broadcast to pupils, rather, they are intended for *teacher-training*, describing and illustrating teaching methods.

A crucial point is that the particular topics in the Adamawa State audiovision packages were merely to illustrate *generally applicable* teaching techniques and their rationale. The intention is that participating teachers should be able to transfer the skills they have learned to the whole curriculum. This is a substantial departure from the nature of IRI, which focuses on individual lessons in a particular subject.

It is unrealistic to expect that poorly trained

Figure 2. Extract from the package "Nuclear Family Roles" (Comment. As in guideline 26, the answer-frame C2 had better be positioned on a separate page from the question-frame C1)

FRAMES in printed booklet, enabling free random access by the learner.	NARRATION referring to the FRAMES

Frame A. Pictures of a family shown to pupils.

Frame B. Answers supplied by pupils.

Father	Mother	Son	Daughter
Ja'o	Chubu	Ori	Charo

Let us listen to a session by an experienced teacher with his/her pupils in primary 3. You will need to look at Frame A. (PAUSE 2)

This contains copies of pictures that the teacher shows pupils.

Incidentally, the teacher has assigned the children to work together in small groups.

1st INSERT *(5 min): Recording of a teacher at the start of the lesson on Nuclear Family with pictures of father, mother, son and daughter, and inviting pupils to recognize the persons in the picture. After they answer, he writes father, mother, son, daughter on the board. He tells the class that each of the five groups that were agreed yesterday will sit at their group tables and script a* **drama** *using the characters in the picture.*

Teacher asks that the drama should illustrate how members of the family are supposed to behave. But first, he invites them to discuss that issue: how the family members should behave. A class discussion follows, guided by the teacher.

After the discussion, he asks pupils to give names to the characters, and writes them beneath Father, Mother, Son, Daughter.

AUDIO TUTOR:

FRAME B shows a photo of the board containing Father, Mother, Son, and Daughter, with the names that pupils assigned to them. (PAUSE 2)

The names that the pupils chose for the family members provide characters for the drama sessions in which groups have been asked to illustrate the roles of family members.

In Frame C1, I have summarised the four techniques used by the teacher so far. (PAUSE 2)

And in each case I have asked you to reflect what was the teacher's purpose for the techniques.

S/He first showed a picture of a nuclear family and invited the class to identify the family members. Then s/he told the groups they will script and perform a drama that will illustrate appropriate roles of the different family members. Thirdly, in preparation for the drama, s/he conducted a class discussion regarding what the family roles should be. And finally s/he recorded the most popular names that the pupils chose – shown in Frame B.

FRAMES in printed booklet, enabling free random access by the learner.

Frame C1. Teacher's Introductory Techniques

Shows picture of nuclear family, invites class to identify the members. PURPOSE? Write answer below.

Groups told they will perform a drama illustrating appropriate family roles. PURPOSE? Write answer below.

Class discusses appropriate roles. PURPOSE? Write answer below.

Teacher invites choice of names for the characters and records the most popular names. PURPOSE? Write answer below.

Frame C2. Teacher's Purposes

Shows picture of nuclear family, invites class to identify members. PURPOSE:

Activates current knowledge. Gets the children actively thinking

Groups told they will perform a drama illustrating appropriate family roles. PURPOSE:

The prospect of performing a drama is exciting – engages pupils.

Class discusses appropriate roles. PURPOSE:

Release pupil's knowledge. Contrast their own family roles with other classmates – gain differing perspectives. (Teacher guided discussion)

Teacher invites choice of names for the characters and records the most popular names. PURPOSE:

Child-centred, democratic choice of names

NARRATION referring to the FRAMES

Now. In Frame C1, write down a few words, below each technique, describing what you think was the teacher's purpose for that technique. Spend some time on this before referring to my suggestions in Frame C2.

(10" JINGLE)

(on 2nd run-through, the workshop mentors allow participants 7 minutes discussion)

AUDIO TUTOR:

In Frame C2, I have suggested some likely purposes for the teacher's techniques. Asking the pupils to identify family members in the picture, **activates** their current knowledge and gets them **thinking actively** rather than sitting passively. They will learn more if their minds are active.

The groups are told that they will perform a drama – and this **prospect** is **exciting**: it stimulates their interest and **engages** them. If they are interested, they will work harder.

Concerning the **class discussion** on appropriate family roles, the teacher hopes this will **release the knowledge** that pupils have about the roles played by their own family members. That existing knowledge will now be at the forefront of pupils' minds – ready to be built upon in the rest of the lesson.

In addition, pupils **contrast** the roles of their own family members with the roles of other pupils' families, so they gain **differing perspectives**

But remember how the teacher **guided** and focused the discussion. This is a crucial role for the teacher; as s/he is a facilitator of learning.

Finally, the teacher invites the pupils to choose the names for the characters in the drama. This invitation is **child-centred**: it shows the pupils that their opinions are important – and it is **democratic** to choose the most popular names. This is one aspect of a Child Friendly School approach.

Well, those are my ideas of the teacher's purposes. You may have other ideas that are equally valid.
The fundamental purpose for all the techniques should be to stimulate the pupils to construct knowledge. For this to happen, pupils need to be thinking actively, interested and fully engaged. They need to have their existing knowledge at the forefront of their minds – and perhaps to question that knowledge after exposure to other perspectives. And they need to feel their opinions are valued and important.

teachers could adapt the IRI techniques without further training. Proponents of IRI do claim to supply such training in some projects (Bosch, 2010). However, the training involves helping the teachers to emulate the style of teaching in the IRI radio programmes. This is a tall order. The techniques are so imaginative and sophisticated that they probably lie well beyond the comfort zone of inadequately trained teachers. Moreover, how could the sophisticated learner-centred IRI techniques be generalised by teachers to other subjects and grades (as IRI proponents claim). More likely the ill-trained teachers will surrender their self-reliance and develop a *culture of dependency* on the IRI lessons (for as long as they can access the materials). In other words, the IRI materials may obstruct rather than foster the teachers' *long-term* professional development.

Thirdly, audiovision is intended to be used not just by radio broadcast but also with CDs, as noted half-way down Figure 2 on the right-hand side. This illustrates the materials in the Adamawa Workshops, where listeners were allowed a 7-minute pause to carry out reflective activities.

Generally, listeners of audiovision can pause the CD for as long as they like – unlike IRI where pauses are restricted to between 3 and 10 seconds (and could certainly not have pauses of much longer, otherwise listeners will think they have lost the radio signal). Hence Audiovision activities can be substantial, whereas the IRI time restriction permits only superficial activities.

Recommendations based on the experience of the project work

During the planning and implementation of the project a number of lessons emerged, as follows.

Where to find master teachers to model the desired methodology and in which classroom

In any project aimed at the professional development of teachers, where shall we find 'master teachers' to serve as models demonstrating the desired pedagogic methodology (in our case, learner-centred, constructivist interactivity)? Over the period of the first two visits, the Lead Consultant (this author) had insisted on recording classes in a real nomadic school rather than in a *model school* attached to the Yola Federal College of Education. The argument was that in-service nomadic teachers would not find the behaviour of children in a model school credible. However, having made lengthy journeys to visit three nomadic schools, (one visited twice during the fourth trip), it was decided that teachers of the FCE model school could be briefed more substantially, since they were on site. Thereby, they would be better models for child-friendly, constructivist peda-

gogy. Six of these teachers (following substantial briefing) were used as model teachers of the six lessons in Table 1, listed in the order that the audiovision programmes were broadcast.

Quality of classroom recordings

The lead consultant was not present at any of the classroom recordings (such visits had not been budgeted for). Following low quality sound recordings in all six of the radio programmes, it was concluded that sound recordists should operate their sound mixing console inside the classroom, (not outside in the OB van), and that a 'boom-microphone' was needed (a microphone attached to a long pole, operated intelligently by an assistant recordist). All six recordings had to be re-recorded several times, four of them in part but two in total. The work involved in repeated reviews and retakes took several weeks within a period of three months.

Table 1
The lessons described in the six audiovision packages

Title of Lesson	Primary Grade
Domestic Animals and their uses	5
Colour Identification	2
Group Work	2 and 3, in the same classroom
Malaria/Hygiene	4
Nuclear Family	3
Shy Children and Composition	3

Table 2
The six audiovision packages that were withdrawn

Title of Lesson	Primary Grade
Making Low-cost Teaching Aids	1
Child Safety	4
Health Education (Part 2)	2
Multiple Tasks, Matched Ability Group Work	1
Multiple Tasks, Mixed Ability Group Work	3
Single Task, Mixed Ability Group Work	5

Several of the above retakes were due to the 'model teacher' failing to demonstrate elements of the desired methodology. This is to be expected: despite substantial briefing, it is not at all easy for a teacher, however experienced, to model an unfamiliar methodology step by step.

In the event that parts of a recording are painfully slow or too fast (e.g. narration by the *audio tutor*), editing software exists that can speed up or slow down the recoding. We did this for one of the radio programmes, speeding up narration by 10%. The result sounded more natural than the original.

For any large project, the pre-specified work plan and budget needs substantial modification

There were many changes made to the original 15-activities Work-Plan, including an increase to 17 activities. For example, the 'Selection of Mentors' was upgraded into a separate activity and carried out later than originally envisaged. This was because the activity needed to include *training* the mentors, which needed to be undertaken two activities later, in order to benefit from precursor activities.

The most significant change to the work plan concerned the budget. After several weeks of considerable design effort and planning, it was discovered that the budget allocated for the Project would be far exceeded if the current production and workshop plans were implemented. The number of radio programmes (and hence audiovision packages) was consequently reduced from the 12 first envisaged to only 6 (see Table 2). Moreover, only half the 448 teachers would attend the workshops for any one radio/audio programme, the other half alternating for the next programme, and so on. Thereby the budget was reduced to an acceptable 25% of that originally computed. The lesson here is that, before wasting time planning a superfluous number of deliverables, a budget and time-scale estimate should have been computed and compared to the project's limited resourcing.

The final Work Plan is on pages 50 to 58 of the report in Commonwealth of Learning (2012). The accompanying Monitoring & Evaluation Plan is on pages 59 to 61.

Conclusion

The project was extremely hard work for all members of the team and for the nomadic teachers, travelling considerable distances to attend the workshops.

Some of the nomadic teachers being trained were more than 25 years in service. The constructivist, child-friendly methods we modelled departed drastically from their ingrained teacher-centred practices. Nevertheless

they received the intervention with tremendous enthusiasm. There was no reluctance to throw themselves into the activities in the workshop centres, as evidenced by video recordings of some of the workshops. As to whether this enthusiasm translated into a change in their teaching methods, no formal impact evaluation in their schools has been carried out. However, we were delighted with the positive anecdotal feedback from nomadic head teachers regarding their teachers' subsequent classroom methodology.

Nevertheless, in the absence of a formal impact evaluation, we are concerned regarding the reduction from 12 to only six audiovision programmes. The originally planned 12 audiovision lessons are what we had judged to be necessary but, as explained earlier, we had to cut back to six due to budget constraints; worse still, the in-service teachers attended only three of the six workshops, staying in their schools to listen to the alternate three radio broadcasts. The six lessons that were withdrawn are listed in Table 2.

We had judged the original 12 lessons (Table 1 together with Table 2) to be representative of both ages of pupils and subject matter. hence, it would be difficult for in-service teachers to generalise from the small sample of six audiovision lessons (Table 1), only three of which were *mentored* at workshops.

It is therefore possible that the drastically abridged training project may not have produced a miraculous change in the existing teacher-centred methodology. In any case, considering the deep-rooted teacher-centred culture, continued in-service interventions promoting child-friendly, constructivist methodologies are advisable to avoid back-sliding. The most obvious recommendation would be to reinstate the 6 withdrawn audiovision programmes and to repeat the project, ensuring all in-service teachers attend all 12 workshops.

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