

## **Audio Instructions in Distance Education: A Study of Recording Practices**

**Solomon Kimani Kabonoki**

Distance Education Unit  
University of Botswana, Centre for Continuing Education  
Private Bag 0022, Gaborone, Botswana  
kabonoki@mopipi.ub.bw

### **Abstract**

In this case study which is specific to the Centre for Continuing Education at the University of Botswana, the investigation reported was in two parts. In the first part, 96 recorded audio productions for a distance education diploma course were examined with a focus on their duration, and with a view to establishing the standard duration for recorded audio programmes. In the second investigation, the speeds of presenting lecturers as they read their audio scripts in the studio were investigated with a view of finding a solution to what distance education students referred to as “fast lecturers in presentation”. The conclusion was the following. With respect to a suitable duration of audio recordings, it was found that most of the recorded audio programmes (67.7%) had durations between 17-24 minutes. The second part of this case study revealed that the audio presentation speeds of lecturers tended to be within the limit of 100 -120 words per minute; the mean reading speeds of different lecturers were therefore significantly different. There was also a need for presenting lecturers to rehearse their written scripts intensely to achieve a conversational-like delivery style characterised by a tendency towards a stable presentation speed.

### **Abstrak**

Dalam kajian kes ini yang khusus kepada Pusat Pendidikan Berterusan di University of Botswana kajian dilaporkan dalam dua bahagian. Dalam bahagian pertama 96 rakaman audio untuk satu kursus diploma pendidikan jarak jauh dikaji dengan fokus ke atas tempoh rakaman dan dengan pandangan untuk mewujudkan satu tempoh yang piawai untuk sesuatu program rakaman audio. Dalam kajian yang kedua, kelajuan pembentangan pensyarah semasa pensyarah membaca skrip audio di dalam studio dikaji dengan pandangan untuk memperolehi satu penyelesaian terhadap apa yang dikatakan oleh pelajar pendidikan jarak jauh sebagai “persembahan pensyarah yang pantas”. Rumusan adalah seperti

berikut. Merujuk kepada tempoh rakaman audio yang sesuai, didapati bahawa kebanyakan program rakaman audio (67.7%) mempunyai tempoh antara 17-24 minit. Bahagian kedua kajian kes ini menunjukkan bahawa kelajuan persembahan audio pensyarah cenderung untuk berada dalam had 100-120 perkataan per minit. Min kelajuan pembacaan daripada pensyarah yang berlainan adalah berbeza cara signifikan. Terdapat juga keperluan bagi pensyarah untuk berlatih dengan skrip penulisan secara berkali-kali untuk menghasilkan stail penyampaian percakapan yang mempunyai kelajuan yang stabil.

## **Introduction**

Teaching with audio materials in higher education dated as far back as 1911 and 1919, with the University of Iowa and the University of Wisconsin respectively being the first to use this medium (Barron, 2004; Wittich & Schuller, 1953). Campton's Encyclopaedia (2001) indicated that the first human voice over the radio was first heard on 24 December 1906. The audio tape had then not been invented and therefore the use of the audio medium in 1911 and 1919 took place through broadcasts or vinyl records. In the literature, Langdon (1988), for example, highlighted teaching with audio materials for its focus on the effects of teaching, citing its widespread accessibility, its low cost and how it paces the learner. Little, however, has been said about the development of audio instructional materials with respect to factors such as their duration, recording practice and the practical models in specific situations. Examples of good practice in conventional teaching and teaching with text materials are, on the other hand, abundant.

According to the University of Botswana Calendar (2005), a face-to-face lecture runs for one hour. This also seems to be the practice elsewhere. Bligh (1998) refers to classroom lectures of 50 minutes. In addition to the duration of a lecture, it is also known that the average face-to-face lecture delivery speed has been estimated by Thompson et al. (1992) to be 100 words per minute.

In distance education, some tutorial sessions are allocated two hours each. Similarly, there are guidelines as to the number of units (chapters) in a written module. At the University of Botswana, a written module (a

specially developed text study material for distance education students) is allocated up to 15 units. Some modules may carry less than 15 units. Indirectly, these guidelines not only dictate how much content to package but also form part of the suggestions on acceptable formatting styles in text-based materials. All these guidelines add value to the final teaching/learning product. In addition, the test styling of the content is also important as indicated by Hartley (2004). Hartley (2004) emphasised the importance of writing and formatting styles in facilitating easy navigation during reading.

According to Davies (1996), the written text has been around since 1450, when it was invented by Johann Gutenberg. In comparison with text, our familiarity with audio materials in learning is recent. In 1888, as noted by Copeland (1991), the technology for recording audio was still at its infancy. The same is also true of other media. Mackenzie (2005) indicated that the use of audio visual materials by learning institutions before the 1960s was limited and these materials were produced by independent film companies and film libraries. This background raises the question of how much we know about audio instructions and their application in distance education. This paper intends to extend understanding of one aspect of the development of audio instructions in the context of distance education.

### **Literature Review**

Right from its early stages, as a broadcast medium, the audio approach was not clearly understood by those using it in terms of what design steps were needed for whatever purpose. Conan (1993) observed that after the first radio broadcast on 2 November 1920 in the USA, stage plays were directly put on air without any efforts to adapt them for listening. It is said that as social awareness grew, criticisms in the way the medium was used were on the rise. As a result, schools for announcers were established to train them in correct pronunciations. Much of production and delivery practices currently in use have evolved from feedback received from general broadcasting situations. Some of these practices and rules have found their way into instructional course development practices.

The earliest application of audio instructions in higher education that mentions the duration of recorded audio delivery is S.N. Postelthwait's audio-tutorial approach (A-T). Russell (1978), in describing Postelthwait's

audio-tutorial system (A-T), mentioned that students took about one hour to interact with the audio tape. Russell (1978) further said that when the A-T system was adapted for use at the elementary school level (first and second grades in science), presentations were 15 minutes long. Langdon (1978), on the other hand, suggested that audio presentations should be within 15-20 minutes. Thomas (2000) related the duration of audio presentations to attention span. He noted that it is difficult to maintain learner attention via audio instruction for more than 15 minutes each time.

With regard to presentation speeds of recorded audio instructions, Barron (2004) cited literature that varied the presentation speed through compression. It is noted that by varying the presentation speed from 126 words to 175 words per minute, comprehension is unaffected. But as the word rate increases from 250 words to 300 words a minute, comprehension is affected. Thomas (2000) suggested a reading speed of 130-140 words per minute in presenting an audio talk in the English language and Kozma (2001) suggested a reading speed of 110-120 words per minute. Foulke (1989) and Langdon (1988) suggested a reading speed of 175 words per minute and McLeish (1999) suggested 160-180 words per minute.

The reading speed during audio recordings is an important part of the design process; a survey by Kabonoki (2001) indicated that a number of students did not understand some audio presentations because the presenting lectures were too fast. So, the duration of audio presentations and the speed of presentations are important factors in the design process.

## **Methodology**

### ***Genesis of the study***

This research did not start in the usual way. The question that led to the study was triggered by a happening. The inquiry started during a normal recording session in the studio. One of the audio scripts that had taken longer than others to finish was being recorded on this day. The presenter, a colleague, had a slow reading pace. When he was on the third page of the audio script, the presenter was requested to take a ten minute break with the hope that a rest might yield faster reading. The presenter rejected this suggestion and hinted that he was just beginning to like the whole

presentation exercise. By 1300 hours, having started at 8 a.m., the recording was just a little over halfway done. Recording was finally over towards the later hours of the day.

It was during the editing of this audio recording that the author discovered that the computer kept a record of the time the presenter took to read a page as the audio clips were edited onto the timeline. From here, the following questions emerged naturally:

1. What was the reading speed of the presenter?
2. What was the reading speed of each of the presenter coming to record afterwards?
3. How did their speeds compare among themselves?
4. How did these speeds compare with speeds quoted in the literature?
5. Of what relevance was the writing guide (to remain within 10-12 pages of typed audio scripts, font 12 and double spaced) to script writers, as an approximation of a 20-minute audio script?
6. Did the audio programmes already recorded have a pattern in relation to their duration? How many met the 20-minute standard duration of audio presentations as recommended in our setting?

A notable aspect of this study is that subjects were not randomly assigned to lecturers/presenters. Their participation in writing audio scripts and presenting them in the studio would be dependent on whether they had undergone training in writing audio scripts and taken part in writing the printed module and/or had taught the distance education students or the equivalent course in a pre-service setting. What started as a mere exercise in writing and recording audio instruction materials became an exercise of investigation.

### ***Mode of collecting data***

In order to address the six questions listed above, data collection was undertaken in two parts. The first part involved taking a head count of all audio recordings from 1999 to February 2006. The purpose of this exercise was to document the duration of each recorded audio programme and to find out how well these recordings remained within our operational standard duration of 20 minutes.

The second part of this investigation involved calculating the reading speeds of lecturers/presenters as they presented their written scripts in the studio. This presented an opportunity to investigate how different the lecturers/presenters were, in terms of reading speeds; this investigation was considered important because a survey by Kabonoki (2001) on the distance education course showed that a number of students had complained that some lecturers were fast in their presentation.

Although a total of 96 audio programmes was examined with respect to the durations, the data for calculating reading speeds were obtained from nine lecturers. The lecturers (two males and seven females) recorded their scripts at the University of Botswana's digital recording studio. Before 2004, our recordings were done in an analogue studio.

Word count was done after the lecturers had left the studio. Lecturers were not aware that their reading speeds were being monitored. This task was carried out when the recorded scripts were edited. Manual word count on each page of the script and the fact that the time taken to read the page could be read off from the computer screen, made it possible to work out the reading speed per page or per given number of paragraphs. As the clips were edited onto the timeline, the time taken was automatically registered on the composer window of the computer. Secondly, the word count facility of the computer was used to verify results obtained through the manual count, except where many handwritten alterations on the script had been made during the rehearsal. Where this happened, counting was purely manual.

### ***The recording process***

The recording process took place in a small studio with a space for two presenters. The presenting lecturer rehearsed the first page of the script before recording. This task was repeated for every page until the whole script was recorded. Rehearsing audio scripts before recording is an important practice. The quality of a well-written script can be destroyed or reduced through poor presentation.

Recorded audio clips for each page were stored in a bin in the computer (*a special folder for keeping clips for specific recordings, say, mathematics or English or science, etc*). Every recorded clip was given a unique name.

The clip name gave details of the page number and the exact lines on the page that were read. If the lecturer made one or more mistakes during recording, the reading was repeated and re-recorded as required. The clip was stored with an appropriate name to avoid confusion during final editing. So only the clip read correctly would be selected during editing. Each clip would be saved, for example, *as math 6 page 1 take 1 from the top of the page; or maths 6, page 1 take 2 from paragraph 25* and so on. This is a creation of the author. This was meant to make editing easy and to avoid skipping a paragraph or losing a clip.

The first page was edited and the time on the computer screen noted. The words on that page were then counted. With this information, it was possible to calculate the reading speed for that page. The process was repeated for every page.

## **Results and Discussion**

### *Durations of recorded audio presentations*

Each audio programme recorded was finally transferred and stored in an open reel tape. The details of the recorded audio programme were printed on the outer cover. The details included the recording date, the title of the programme and course, the name of the writer, the programme duration and so on. During this part of the investigation, the interest was a search for the duration pattern of audio programmes recorded between 1999 and early 2006 and whether from the pattern, a general conclusion would emerge giving a representative duration to be used as a guide in future recordings.

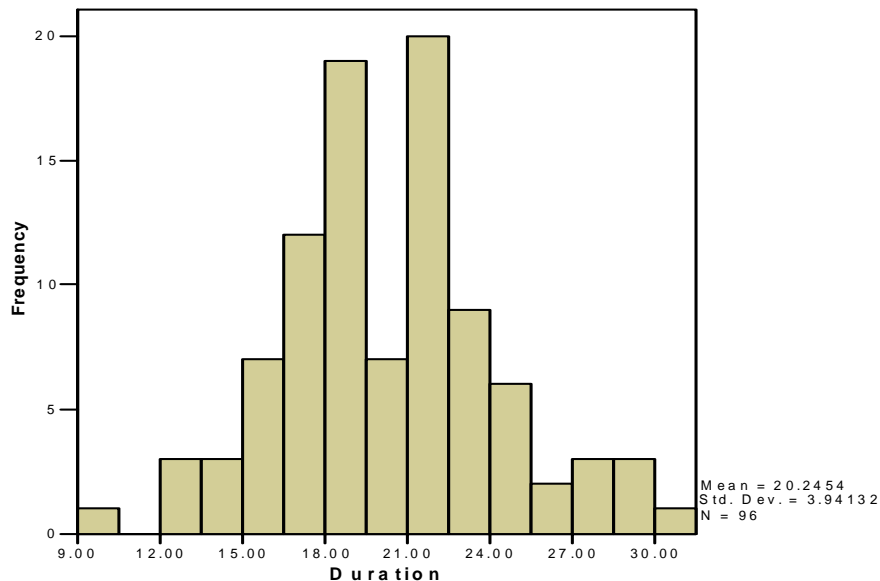
The durations of the 96 recorded programmes were arranged in ascending order. Using SPSS, the cumulative percentage information was broken down into quartiles as seen in Table 1. The range in each quartile is indicated in Table 1. One notices that the shortest duration was 9:34 minutes and the longest duration 30:33 minutes. It is noted that the difference between the shortest duration and the longest duration in the first quartile was 8:13 minutes. In the second and third quartiles, the difference between the longest and the shortest durations was 2:10 minutes and 2:34 minutes respectively. In the fourth quartile, the difference between the longest duration and the shortest duration was 7:41 minutes.

Further scrutiny of the data analysed shows that only one recording was exactly 20 minutes long. If 19:30 minutes - 20:30 minutes are taken to be close to 20 minutes, only 12.5% of the recordings fell within this range.

**Table 1** Range of the quartiles

	Range of the quartiles		Number of programmes
1 <sup>st</sup> Quartile	9:34 – 17:47	8:13 minutes	24
2 <sup>nd</sup> Quartile	17:50 – 20:00	2:10 minutes	24
3 <sup>rd</sup> Quartile	20:12 – 22:46	2:34 minutes	24
4 <sup>th</sup> Quartile	22:52 – 30:33	7:41 minutes	24

The information is also represented on a histogram Figure 1. To the left of the histogram, recordings with short durations might raise queries of how well the content was covered. To the extreme right, the longer durations may be indicative of good content coverage in greater detail but reaction from students about these durations would be of interest.



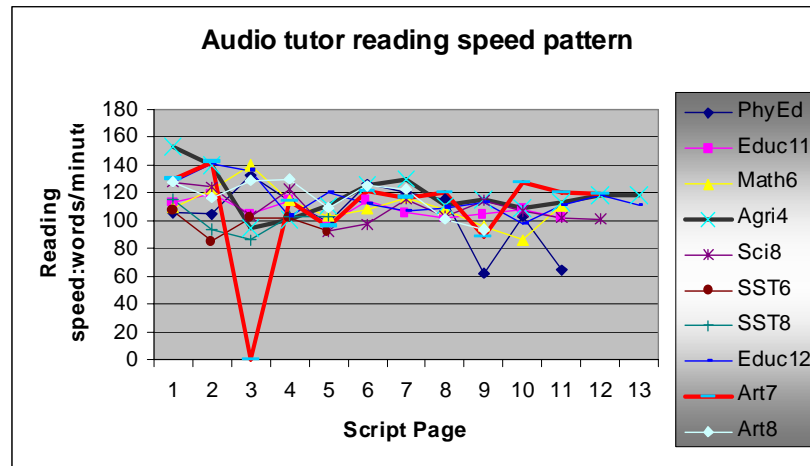
**Figure 1** Trend of the duration in minutes of audio programmes designed and recorded between 1999 to February 2006. Most recordings were between 17 - 24 minutes.



*Lecturer presentation speed*

The second part of this study deals with the measurement of the reading speeds of the lecturers. Lecturers who read their scripts in the studio are also referred to as presenters.

The graphical representation of nine lecturers who read scripts on different subject matters and their reading speed patterns are shown on Figure 2. The details indicate how presenting lecturers progressed from the first page of the script to the next one and so on. In Figure 2, it is noted that there was a sharp drop to speed zero by the presenter for Art (programme 7). But this is not to be interpreted as such. This represents a missing value with the computer assigning a value of zero speed as such. After this gap, the presenter appeared to have had a stable reading all the way to the end of the script. The physical education presenter showed a sudden saw-tooth feature towards the end of the script. A second look at the original data and the script indicate that during the recording, there were several handwritten adjustments to the physical education script on the last two pages.



**Figure 2** Audio lecturers' reading patterns

The general pattern of Figure 2 appears to be characterised by high and low reading speeds between page one and the fourth page. After page four, presenters appeared to take a more stable presentation pattern. For most lecturers, this was the first experience in a recording studio. After the fourth page, there was a tendency to stabilise in terms of speed, as the

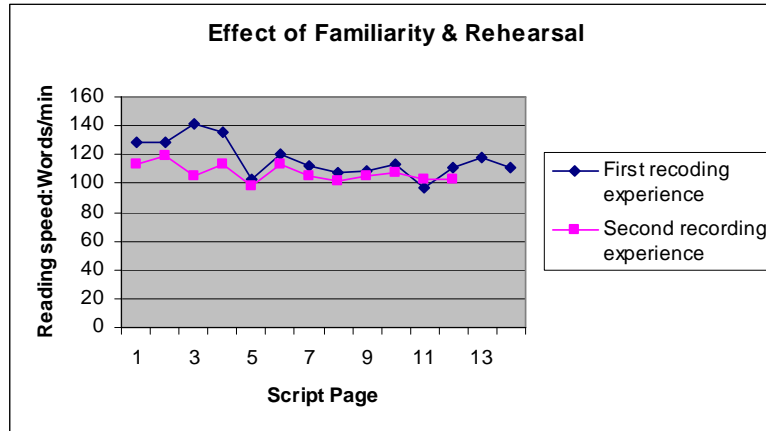
presenters became used to the recording exercise. Their reading speeds tended to move towards a stable presentation speed of about 100-120 words per minute except in the case of physical education. The average speed for each presenter was calculated. Analysis shows that the mean reading speeds of lecturers were significantly different at the  $p < 0.05$  level. It is also clear from Table 2 that the mean reading speeds were greater than 100 words per minute except in one instance (97.89 words per minute).

**Table 2** Audio tutor mean reading speeds (words/minute)

Subject	Mean	Minimum	Maximum
Phy. Ed.	104.4291	62.40	133.42
Educ. 11	107.6364	97.70	118.60
Maths 6	110.5000	86.60	139.70
Agric.4	118.5108	95.14	153.80
Scienc8	109.1417	92.90	127.80
SocialSt7	97.8900	85.67	107.12
SocialSt6	100.4400	86.60	115.50
Educ.12	115.8462	97.00	141.00
ArtC.Des8	117.8545	88.90	142.00
ArtC.Des7	117.3000	94.12	129.84
Total	111.3694	62.40	153.80

All lecturers received the same training in writing scripts. They recorded and rehearsed in the same audio studio. The variable was, therefore, their presentation speed. Figure 2 represents a one-off experience. Rarely did a presenter have an opportunity to make a second presentation. Those who came for a second time did so after several months or after a year or more. However, one lecturer (the presenter for Education 11 and 12) appeared in the studio twice. The time interval between the first and the second appearance in the studio was 12 days.

When the recording pattern for this lecturer was plotted (Figure 3), the curve seemed to remain within 100-120 words per minute limit. This was the only instance where a lecturer returned to the studio within a few days for a second recording.



**Figure 3** Presentation patterns as a result of familiarity with the studio

It is obvious from Figure 3 that during the second visit, the lecturer was already familiar with the studio environment and knew the importance of rehearsal. The lecturer read the audio script with confidence. Stability towards a presentation speed of 100-120 words per minute appeared to be the trend.

### Conclusion

The trend that seemed to emerge from the 96 audio recordings at the Centre for Continuing Education indicates that the mean duration of the recorded audio programmes under the design and production model used at the Centre was 20.25 minutes. All recordings had been subjected to a stringent editing process to ensure that only the most essential content was finally recorded. For this reason, it was agreed that any recording between 19.30 - 20.30 minutes would be considered to have fallen within the target duration; as such, only 12.5% of the total production could be said to have fallen within the target range and 40.6% were below the target duration. These results are indicative of the need to re-examine how the 40.6% group of presenters could meet the content coverage as defined by the Centre's content coverage model. Table 1 also provides further confirmation that there is need to give attention in this regard to the 24 recordings in the first quartile.

With regard to presentation speeds, the figures obtained in this case study seem to indicate that presentation speeds tended to fall within the limit of between 100-120 words per minute. The mean presentation speeds in this case study were generally higher but close to the face-to-face lecture presentation speed of 100 words per minute.

The concern raised by our distance education students about “fast lecturers” seems to be justified because the mean reading speed of lecturers is significant. The need therefore for a meaningful rehearsal before recording cannot be over estimated. It would also be desirable to keep the interval between one recording and the next short, when the same lecture is involved, so that the experience gained in the previous recording exercise can enhance the recording of the second and subsequent presentations in the manner demonstrated in Figure 3. The script writing guide given to trained script writers asks them to cover the identified course content in 10-12 pages of double space and font 12, A4 size paper. The 96 audio recordings revealed durations ranging from 9.34 minutes to 30.33 minutes. The suitability of the script writing guide can only be assessed after more investigation into the coverage of the recordings with shorter durations and what students say about recordings whose duration approach 30 minutes.

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