Multimedia Materials for Native Language Programs

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Electronic offprint with permission of the publisher:

Erich Kasten (ed., 1998):
Bicultural Education in the North—Ways of Preserving and Enhancing Indigenous Peoples' Languages and Traditional Knowledge.
Münster, New York: Waxmann Verlag GmbH
xii + 293 pages
ISBN 3-89325-651-2

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Introduction

Nowadays, modern computers with sound card and CD-ROM drive permit a form of language learning in which interactive multimedia programs serve as a—at least partial—substitute for teacher-guided learning. For the major languages of the world such CD-ROM courses combining text, illustrations, audio and video have been available for the last couple of years since computers with sound facilities became available at reasonable prices.

This paper discusses some general questions about multimedia materials for native language programs: the how and why of this particular kind of presentation. The discussion will focus on the technical side which I consider adequate because this is the only aspect that has not been mentioned elsewhere in one form or other in the other papers of this volume.

A caveat at the opening: although a few multimedia materials for native language programs have been available since the beginning of the present decade—starting with Hypercard stacks for Apple Macintosh computers—there has been little feedback with regard to their practical implementation and little evaluation of the pedagogical concepts involved because the wider dissemination of multimedia is just beginning in native communities.[1] Moreover, computer science is advancing rapidly and multimedia is one of its most dynamic fields. Therefore, it is necessary to emphasize the preliminary character of this paper's content.

Is it Technically Possible at all to Introduce Multimedia Materials to Native Communities and Native Schools in the North?

In most native communities and native schools of Northern America and Scandinavia computer equipment is available with which multimedia materials can be used, even though there may be a lack of specialists servicing the machines, so technical problems can sometimes cause trouble. Such has

been the experience with regard to earlier multimedia projects in the Arctic—mainly on Eskimo languages and other languages of the American Arctic.

In Siberia and the Russian Far East, the situation is worse (see also Habeck, this volume), but nevertheless, at least in Kamchatka, there are computers in many schools, although, unfortunately, electricity is not available all day long to run them. In Russia, as in other countries in which native schools suffer considerably from small budgets, the technical requirements for hard- and software have to be as low as possible to avoid expenditures for additional computer equipment if the funding for the particular multimedia program does not include equipment for the schools, in addition to the costs for the development and production of multimedia materials. This means a limitation to standard VGA resolution (640x480 pixels and 256 colors) and, as well, to software compatible with any operating system up to and including Windows 3.1.[2]

How to Achieve such Multimedia Curricula for the Languages under Consideration?

Commercial CD-ROM productions are expensive; they cost at least $50,000, mainly because of the wages of the computer specialists and the artists involved. But, during the last year, the duplication costs of compact disks went down to approximately $1,500 for 500–5000 copies; CD-ROM recorders can be found for less than $300, recordable CDs for $2 each. As a result, producing CD-ROM language materials may even be cheaper by now than producing paper-based ones—leaving aside the question of wages.

But even wages can be drastically reduced by producing multimedia applications on the basis of already existing materials. Using standard software, including share- and freeware, and simplifying technical and graphic aspects will result in a reduction of production time and costs and of the effort involved in the acquisition of the skills necessary to produce multimedia products and in making 'do-it-yourself' multimedia feasible.

To explain some technical aspects I will refer to the Itelmen language materials on CD-ROM that are being prepared at present by Erich Kasten and myself, based on the new Itelmen teaching materials prepared together with Klavdiya N. Khaloimova (see Khaloimova, this volume).

In planning new language materials, books, tapes and multimedia must be viewed as a unit. The layout of books and multimedia should be as similar as possible. This can be achieved if the book edition is not too overcrowded with text, which is an important pedagogical need, anyway.

If this is the case, as with the Itelmen materials, it will be possible to convert the printing files to a hypertext structure with the help of programs such as, e.g., Adobe Acrobat Exchange. With hypertext available, linking the various parts of the materials with each other and linking sound or movie files to the material can be easily achieved.

In the particular case of the Itelmen materials, the ethnographic orientation of the printed book proved of particular value in adapting the materials to a multimedia CD-ROM. The presentation in the form of a multimedia product looks quite natural, and I hope, attractive as well. The final version will comprise at least all the texts of the schoolbook (Khaloimova, Dürr, Kasten, Longinov 1996), spoken in the southern and northern dialect as well, plus a few short sample texts—in all, approximately 2 hours of spoken Itelmen. Additionally, to illustrate certain points, movies will be added. A demo of the Itelmen multimedia CD-ROM can be downloaded at the following web site:

http://www.fbls.uni-hannover.de/sdls/schlobi/text-ton/demo_itelm/demo_it.pdf

If one has the technical expertise, a multimedia CD-ROM with about 2 hours of sound may be completed in about 50–100 hours of work. Of course, it is important to stress that this requires good documentation on tape, and written materials that can be easily used as the basis for multimedia materials. Changes in the conception or even a completely new layout will increase the work time considerably.

The work time mainly depends on the efforts involved in editing sound files. This comprises

- digitalization of original sound recordings (sections of 10–30 minutes),
- cutting, and if necessary editing of sound files (at word or sentence level, depending on the written hypertext),
- linking hypertext to sound files.

The Itelmen materials, including approx. 2,000 sound files selected from 8–10 hours of interviews, certainly will approach the upper limit of 100 hours. But, in estimating the expenditure, it should be taken into account that computerization of sound recordings is an effort from which any analysis of data will profit considerably (see Whittaker, this volume). Much time and

frustration can be spared in analysis—but also in language learning—without the necessity of reeling tapes back and forth continuously.

Due to the limitations in the storage capacity of CD-ROMs to 650 megabytes, the quality of sound recordings has to be considered. Most modern computers permit 16bit/44kHz stereo recording which would limit the capacity to approx. 1 hour (5.2 megabytes per minute and track). This quality is not necessary for spoken language sound files. I consider 16bit/22kHz mono (approx. 2.6 megabytes per minute) adequate, although unsatisfactory lower-quality recordings can also be used—whether 8bit/22kHz (as e.g. in older Hypercard applications) or 16bit/11kHz (as e.g. in Tsi Karhakta)—that once more double the storage capacity for sound. Higher quality is only necessary for music, but, taking into account the fact that small active speakers are used with many computers, in most cases 16bit/32kHz mono (3.8 megabytes per minute) seems to be a fair compromise between quality and storage capacity.

Movies should be used sparingly and in low quality because of the time involved in editing (digitalization requires at least 10 times the video's length) and the high technical requirements of the computers to be used in production and playing where memory restrictions on CD-ROMs, transmission rate of the CD-ROM drive and port, and quality of the monitor and graphic card set clear limits.[3] As a rough guide, movies of basic quality require between 10–20 megabytes per minute, depending on screen size, number of colors, data ratio and compression rate.

The generation of a hypertext version of the text and the illustrations is less complicated. Using Adobe Acrobat Software, standard data compression of files leads to good results even if a user has a large monitor or wants to zoom in on some detail; only color illustrations should be adapted to 640x480 pixels to reduce size and loading time of files. If other programs with a fixed size of multimedia presentation are used, the conversion should be to 640x480 pixels.

The structure of links and the arrangement of the links to different parts of the multimedia edition has to be well-considered, but it so heavily depends on the concept of the language materials that brief recommendations would be of little benefit. What is important is an intuitive and simple navigational structure with clear entry and exit points, notes, and return links. Complex structures in which too many links are found, tend to be confusing both to the end-user and to the developer.

Why Does it Makes Sense to Put Multimedia Materials Alongside those in the Long-established Print Medium?

The use of multimedia materials has a number of positive effects compared to printed editions, or even printed editions with accompanying audio cassettes:

- The use of modern computer technology lends prestige to the native curriculum and, at the same time, helps people to consider traditional culture and language as consistent with modern life (see Kasten, this volume).
- It makes language programs more attractive to students. Children especially like to play with the computer, so a multimedia-based language and culture curriculum can compete successfully with other forms of modern media to a certain extent.
- It permits a more comprehensive presentation of knowledge. The student can browse and follow the paths of the links in different ways. Thus, the complex interaction of language and culture, and, for example, of grammatical items as well, can be presented more adequately than in the necessarily linear arrangement within books. The inclusion of speech, music, and movies facilitates the perceptualization and memorization of cultural activities in their broader situational context.

  Moreover, in this manner, multimedia materials may even give us the opportunity to mimic to a certain extent the patterns of traditional acquisition of native language and cultural competence, which in many cultures formerly relied on repeated observation, playful pursuit and accompanying (more or less informal) explanation instead of abstract, decontextualized texts.

  In this context it should be mentioned that all examples of multimedia materials for native language programs available to me—in contrast to the Itelmen ones—represent grammar-centered approaches without much illustrative information on the cultural context of vocabulary.
- Presenting language data only in written form entails a loss compared to the variation which can be found in spoken language. This loss can be partially compensated for by adding sound and movies to the text in multimedia. Additionally, whereas high costs for printing and the constraints of the print medium make it difficult to cover linguistic varieties, this is far easier to achieve in multimedia.

- The usability of multimedia products for partial self-instruction is important where regular teacher-guided language learning is not possible, a situation which may result, e.g., from dispersed settlement patterns or from the lack of native experts to teach the language. In the latter situation, easily available sound recordings on CD-ROM will be crucial.

  Of course, this point should not be misunderstood: self-instruction can play only a subsidiary role in language teaching beside old-fashioned classroom teaching as done by a qualified teacher.

Notes

I gratefully acknowledge the help of Gordon Whittaker, who—in the last minute—went over what the author presumed to be English.

1) Since the Halle conference I have become aware of several multimedia projects and reports on multimedia for native language programs which I had no opportunity to consult before the deadline of this paper. As I want to continue work on multimedia—I just recently started to cooperate on multimedia with the "Proyecto de Educación Maya Bilingüe Intercultural" in Quetzaltenango, Guatemala—any e-mail contact would be welcome: duerr@berlin.snafu.de.

2) While travelling through Guatemala in May 1998, I was confronted with the same situation.

3) Videos with more than 256 colors cannot be viewed adequately with old or cheap monitors and graphic cards—videos with more than 10 pictures/second tend to play irregularly or even break down on older CD-ROM drives.

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