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Ann K. McNamee*

Publishing and Pedagogy Using Multimedia on the World-Wide Web

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ABSTRACT: The Internet offers the promise that music theorists and their students will be able to integrate and synchronize high quality audio and images with their text analyses. One of the challenges is to make on-line multimedia publishing as easy for the author as print publishing is today. I offer my multimedia article on Bacewicz's Second Piano Sonata and the work of some Swarthmore undergraduate students, who used a template of mine to produce their own projects, as possible models for future multimedia music theory publishing on the Web.

Refer to the following Internet URL: mcnamee.graham.com

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0. Introduction

[0.1] I have two goals for my research with regard to multimedia publishing on the Internet: 1) to explore ways to enhance music theory publishing by including sound and graphics; and 2) to encourage greater use of the Internet for music by creating a template which students and colleagues can use to author their own work.

[0.2] The Internet offers the promise that music theorists and their students will be able to integrate and synchronize high quality audio and images with their text analyses. One of the challenges is to make on-line multimedia publishing as easy for the author as print publishing is today. While all of the basic technologies necessary for on-line multimedia publishing exist today, the technology still places a greater burden on the author than does print publishing. (This article is a significant revision of a paper presented at the Mozarteum in Salzburg, Austria for a symposium entitled "New Media: Technology and Internet for Creative Applications," held January 4-7, 1997.)

1. First Goal: Enhancing Music Theory Publishing

[1.1] My first goal, an enhanced form of music theory publishing, combines high-quality sound synchronized with musical examples. In order to follow the discussion below, you should link to my analysis of Grazyna Bacewicz's *Piano Sonata No. 2* at the following URL: <http://mcnamee.graham.com>

[1.2] The format of this site requires a large computer monitor. Choose one of the versions of the analysis. If you cannot see two frames, one which is a photo of a piano on the left-hand side and one with instructions on the right, then proceed to the section below which begins, "Second Goal: ..." The format of that site (<http://ash.swarthmore.edu/womuse>) works well even with a smaller monitor.

[1.3] My analysis was written in 1993, mostly in text format, for *Music Theory Online* (<http://128.111.94.30:80/mto/issues/mto.93.0>). In 1996, I reworked the analysis into several different multimedia formats for the World-Wide Web (<http://mcnamee.graham.com>). In terms of technology, the target platform for my work is a Macintosh, a PC, or a Unix workstation equipped with a Netscape or Microsoft browser. At a minimum, the browser should be a version current enough to display two frames and to support the Quick Time plug-in. Other formats on my site add the Shockwave plug-in and Java applets.

[1.4] My design for multimedia is to have scrollable text down the left-hand side of the screen with the musical examples appearing over to the right-hand side. In order to save download time, I recommend that you scroll down the center scroll bar until you reach "Example 1." Click on "Example 1" in order to see the score and to hear the audio. (The pianist in this performance is Charles Abramovic.)

[1.5] The technical reason for this two-frame design is that audio files are too large to be embedded along with text in only one frame. The scholarly benefit of this design is that while the reader is waiting for the music to download, he or she can still read the text. The center scroll bar remains active during the transfer of the music file.

[1.6] If you are using the Quick Time version and scroll down to "Example 2a," you will notice that the score will "flip pages" automatically, synchronized with the audio. You are hearing near CD-quality sound. It is 16-bit sound, 11 kHz, but mono not stereo. (If you are using either of the streaming audio formats, the Shockwave or the Java version, you must flip the pages manually. There should be no pause in the audio when you click to turn the page of the score.)

[1.7] Three more examples on this site directly address the issue of multimedia for music theory publishing. The first one addresses sketch material. Go to "Example 3," scroll a bit further so that the sketch material is visible in the left frame, then click on "Example 3." My design offers the opportunity to study sketch material on the left-hand side, compare it to the published score on the right, and, most importantly, to listen to the passage under study.

[1.8] The second example addresses the topic of MIDI sound. In this article, I discuss a Polish folk mode, the Podhalean mode. To me, it made sense for the reader to be able to hear this Podhalean mode, so I made a recording of it on a MIDI keyboard. Scroll down in the article until you get to the button for "The Podhalean Mode." Listen carefully to the audio for that link. MIDI quality is fine for listening to a scale such as this (and certainly fine for rudimentary piano playing), but MIDI is unfortunately not suitable as a format for musical performance.

[1.9] The last example I want to show in this article is something that is impossible in print publishing. Link to the very last button, "Analysis of the Development." You need not wait for the entire Quick Time movie to download; even if you stop downloading after 20% you should still be able to see my point, explained below.

[1.10] In this example you hear the Development of the Piano Sonata. The score will be on the bottom half of the screen, synchronized with the audio. In addition, my analysis is on the top half. This example has what I affectionately call the "bouncing yellow bar" which highlights where you are in the analytical graph as the music is played. This design relates the sound *both* to the analysis and to the score.

[1.11] In all of the examples above I hoped to show how high-quality audio, when synchronized with musical examples, can enhance music theory publishing in more than one way.

2. Second Goal: Designing a Template for Other Authors

[2.1] My second goal is to create templates for colleagues and students in order to lower the barriers for authors who might use multimedia on the Web for music theory publishing. I used a template and about four hours of individual instruction to help five undergraduate, non-music majors design their own Web sites in the fall of 1996. The students were in no way technologically more advanced than the typical Swarthmore College undergraduates, and in some cases had only elementary computer skills. Four hours per student is not an insignificant commitment of time, but I estimated that I spent over 700 hours developing my first Web site from scratch, so four hours per student seemed to prove the usefulness of the template!

[2.2] The students' work can be found at the following URL: <http://ash.swarthmore.edu/womuse>. I particularly recommend the first three sites. The first is a project by Julie Hovis on Francesca Caccini. The second is by Rebecca Johnson, whose project is on the music of her great aunt, Rebecca Clarke, and the third project, by Emily Mott, includes a Bantu midwives' song/dance.

[2.3] Note that the two-frame design is still present. For those who are familiar with HTML tagging, you are of course welcome to download and use all of my tagging in this site. (The only proprietary code is that for the Java applet. Contact John or Matt Graham at <http://www.graham.com> for questions about the Java code.)

[2.4] My students never learned any HTML tagging, nor did they need the Java applet. My template was designed using the Macintosh version of Claris Home Page. This inexpensive software is a drag-and-drop Web editor which relieves most headaches associated with HTML. A copy of the software was put on a Swarthmore College server so that the students could work on their projects at any time from their dorm rooms or wherever. The Quick Time movies were created using Macromedia Director and SoundEdit. Scores and photographs were scanned using Adobe Photoshop.

3. The Template: Overall Two-Frame Design

[3.1] The way I handled the design with my students was to give them a twenty-minute demonstration,

then to hand them a floppy disk with the template on it. By reading the above article, and by seeing and listening to some of the musical examples, you will have more than completed the demonstration portion. I would be happy to mail any interested SMT member a Macintosh floppy disk with my Claris Home Page template on it. All you need to do is to drag your text and images to the appropriate spots and erase my text.

[3.2] For those who are comfortable with HTML, you can set up the two-frame design with the following HTML tags:

```
<HTML>
<HEAD></HEAD>
<FRAMESET COLS=*,475>
<FRAME NAME="text" SCROLLING=YES SRC="article.html">
<FRAME NORESIZE NAME="score" SCROLLING=NO SRC="welcome.html">
</FRAMESET>
</HTML>
```

[3.3] If you prefer the format which allows for smaller monitors, you should change the "475" above to "340" (which allows for a standardized reduction of Quick Time movies). Some might feel compelled to add to the HTML tagging above. Here is some slightly expanded HTML tagging, which works for smaller monitors:

```
<HTML> <HEAD></HEAD> <FRAMESET cols="1*,340">
<NOFRAMES>
<BODY>
<P></P>
</BODY>
</NOFRAMES>
<FRAME src="leftframe.html" name="text" scrolling="yes">
<FRAME src="rightframe.html" name="score" NORESIZE scrolling="no">
</FRAMESET>
</HTML>
```

4. Scanning Musical Scores

[4.1] I use Adobe Photoshop for scanning, but any similar application will do. Save your images as either GIFs or JPEGs in order to add images to the left-hand side of the article. The images of the musical examples needed for Quick Time movies on the right-hand side should be saved as GIFs. The version of Director that I use (4.0) allows only images saved as GIFs to be imported. (I have been told that the more recent version of Director allows for smaller sized formats like JPEG images.)

5. Links to Musical Examples

[5.1] Because audio files and Quick Time movies are so large, one should link to the large files only when necessary. This is the philosophy behind the two-frame design. Claris Home Page allows you to set up these links easily.

[5.2] Those who are comfortable with HTML tagging can easily set up links to musical examples. In the two-frame design above, I call the left-hand frame "text" and its HTML tagging "article.html". Within "article.html" one can link to a musical example (which will appear in the right-hand frame, called "score," with its own HTML tagging). The tagging for "article.html" is as follows:

```
<A HREF="example1.html" TARGET="score">Example 1</A>
```

[5.3] The HTML tagging for "example1.html" (which includes a Quick Time movie called "newer1.mov") in the right-hand frame is as follows:

```
<HTML>
```

```
<HEAD><TITLE>example1</TITLE></HEAD>
<BODY BGCOLOR="#FFFFFF">
<EMBED SRC="newer1.mov" Border=0 ALIGN=left
HEIGHT=412 WIDTH=448>
</BODY>
</HTML>
```

[5.4] For smaller monitors, the tagging for "example1.html" (which includes a Quick Time movie called "caccini.mov") is as follows:

```
<HTML>
<HEAD>
<TITLE>score</TITLE>
</HEAD>
<BODY BGCOLOR="#FFFFFF">
<P><EMBED SRC="caccini.mov" WIDTH=320 HEIGHT=260 Border=0 Align=right>
</P>
</BODY>
</HTML>
```

6. Copyright Issues

[6.1] The very thing that makes Web publishing compelling--the ability to incorporate audio and animation--raises significant copyright issues. For the piano performance of the Bacewicz piece, I hired Charles Abramovic to perform the piece, then came to an agreement with him on a mutually acceptable fee in order that I owned the right to put his performance on the Internet.

[6.2] In order to scan the sketch material, I received permission from the University of Warsaw. In order to scan the score, I received permission from Polskie Wydawnictwo Muzyczne (PWM). Although this score is reprinted in James Briscoe's wonderful Historical Anthology of Music by Women--requiring written permission from Indiana University Press--the copyright rests with PWM.

[6.3] I commissioned an artist, Kathe Grinstead, to take the photograph of the piano. We agreed on a fee which would allow me to publish her photograph on my site. The students followed similar procedures for their work. They used photos and performances of their own making in most cases, and received permission to use the scores. In the case of Rebecca Clarke's manuscripts, the copyright rest with the student's father, keeping those issues all in the family.

[6.4] Information about copyright issues can be found at many sites. For my needs, I found the following two sites and their many links to other sites to be the most useful:

CETUS (Consortium for Educational Technology in University Systems) An excellent resource for "Fair Use of Copyrighted Works" at: <http://www.cetus.org/fairindex.html> and: EFF (Electronic Frontier Foundation)'s "Multimedia Law Handbook: A Practical Guide for Developers and Publishers" at: <http://www.eff.org/pub/CAF/law/multimedia-handbook> In particular, the discussion in EFF's handbook about popular myths might be especially relevant to us. Myth #2 reads as follows:

I don't need a license because I'm using only a small amount of the copyrighted work.

It is true that de minimis copying (copying a small amount) is not copyright infringement. Unfortunately, it is rarely possible to tell where de minimis copying ends and copyright infringement begins. There are no "bright line" rules.

[6.5] Copying a small amount of a copyrighted work is infringement if the copied section is a qualitatively substantial portion of the work. In one case, a magazine article that used 300 words

From a 200,000-word autobiography written by President Gerald Ford was found to infringe the copyright on the autobiography. Even though the copied material was only a small part of the autobiography, the copied portions were among the most powerful passages in the work. Copying any part of a copyrighted work is risky. If what you copy is truly a tiny and nonmemorable part of the work, you may get away with it (the work's owner may not be able to tell that your work incorporates an excerpt from the owner's work). However, you run the risk of having to defend your use in expensive litigation. If you are copying, it is better to get a permission or a license (unless fair use applies). You cannot escape liability for infringement by showing how much of the protected work you did not take.

7. Footnotes and Bibliography

[7.1] Footnotes and bibliography are added as end material to the text in the left-hand frame. The students designed some interesting cross-referencing footnotes and bibliographic references which are made possible because of the linking features. One can easily skip to and from footnotes, bibliography, and main text without going outside the same left-hand frame document.

[7.2] Those who are comfortable with HTML tagging can set up the footnote links exactly the way you link anything within the same document.

For footnote "1" in the body of the text:

```
<A NAME="(1)"></A> <A HREF="#footnote1">(1)</A>
```

For the footnote itself, with a link back to the body of the text:

```
<A NAME="footnote1"></A> <A HREF="#(1)">1. Rosen, Judith,</A> <I>Grazyna Bacewicz: Her Life and Works,</I> Polish Music History Series, vol. 2 (Los Angeles: University of Southern California, 1984), 15.</P>
```

8. Cosmetics -- Varying Typefaces, Photos, etc.

[8.1] Claris Home Page has a user interface which looks like most word processing applications, making it extremely easy to add bold, italics, different sized type, etc. Photos are scanned the same way musical scores are scanned. If you save a photo as a GIF, that GIF icon can be dragged and dropped into Home Page and appear exactly where you want it. You can then easily center or move the photo. All the HTML tagging is added automatically. Other nice design features, such as borders and tables, are done equally easily with Home Page. Separate explanatory windows appear for tables, for example.

[8.2] However, do not assume that you can set the exact look of the typeface itself. Users can control the typeface in their WWW browsers. There are other ways that Web publishing does not yet match all the features of print publishing. One forfeits many of the same things that one forfeits with e-mail--in the case of my essay, dots over "Z's," the carets over scale-degree numbers, superscripts for footnotes, and so forth.

9. The Quick Time Movies

[9.1] This is where the crunch comes, both in the learning curve and in expensive software. Several software packages are available for creating Quick Time movies; I can only speak about using Macromedia Director and SoundEdit. If you already have access to a copy of Director, I would be happy to mail you my template for the Quick Time movie on a Macintosh floppy disk. If you look at my skeletal movie you will see how to substitute your own audio and pages of score.

[9.2] The design for a synchronized musical example works as "a movie within a movie." I first saw this design when Sasha Magee (sashax@igc.org of Infrared Communications, <http://www.eline.com/Infrared/Shocked/index.html>) used it as part of my paper/demonstration at the joint meetings of SMT/AMS/CBMR in New York City ("Networking: Initiatives in Music Scholarship on the Internet," November 3, 1995). I then redesigned his format for use on the Web with the help of a

[9.3] First, one needs the audio. Part of Director 4.0 is SoundEdit, which I use to format the audio. In the case of the Bacewicz piano sonata, I started with a 54 MB AIFF sound file (which is too large even for me!). The original recording was made with stereo sound, at 16 bits and 44 kHz. For my ears, the compromise of keeping 16 bits but reducing to mono and 11 kHz translates best for listening through a computer while reducing the size of the file. After changing the audio format in SoundEdit, one can then save the audio file as a Quick Time movie. Import this audio Quick Time movie as one member of a larger Director movie.

[9.4] Second, one needs to import the pages of musical score. As mentioned above, scanned images of the score can be imported into a Director movie as GIFs. Just as the Quick Time audio "movie" is one member within a larger Director movie, each page of the score is its own member as well.

[9.5] Third, one synchronizes the audio with the pages of score. Director uses a one-second counter. Time by one-second intervals when you need to "flip the page." The animation you create will synchronize the score with the audio. Save the larger Director movie as a Quick Time movie. In the example above the Quick Time movie was saved as "example1.mov".

[9.6] Last, one links the Quick Time movie with the text. If you are using Home Page, you simply import the Quick Time movie into the right-hand frame. If you are comfortable with HTML tagging, use the tagging in the section above entitled "Links to Musical Examples."

10. Conclusion

[10.1] My enthusiasm for Web publishing is inspired by the hope that we can add the "music" to music theory publishing. My belief is that when the barriers to adding audio to our work are low enough, we will enter a new era in our field. When high-quality audio is synchronized with musical examples, I believe that music theory publishing can be enhanced in many ways. I also have another hope. This platform can bring high-quality recordings of new music (in the case of my interests, little-heard music by women composers) to a wider audience. I look forward to any questions or feedback (or contributions to the site!) you may have.

Ann K. McNamee
Swarthmore College
Swarthmore, PA 19081
amcname1@swarthmore.edu
Internet URL: mcnamee.graham.com

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*prepared by
Jon Koriagin, editorial assistant
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