

Digital Image/Sound and the Fine Arts: A Double Major with Computer Science and Fine Arts

This paper describes the new double major/minor in Digital Image/Sound and the Fine Arts in conjunction with the Option in Computer Science: Computer Applications. Central to the program is a two-course sequence, each six credits and two semesters in duration. DFAR 350 Multi-media Authoring was introduced in the 1997-98 academic year, and DFAR 450 Advanced Workshop: Theory and Practice in Digital Image/Sound will be offered in the 1998-99 academic year. Results of teaching DFAR 350 are presented, including a demonstration of the course Web site used to support in-class teaching and examples of student work using HTML, Macromedia Director with Shockwave, VRML and Javascript.

The emergence of the "digital arts" calls for a re-alignment and exploration of intersections across a number of disciplines previously separated by department and faculties at universities, colleges, and specialized schools. The World Wide Web is perhaps the most recent example of how a new technology "retools" pre-existing skills and aesthetic practice from previously separated domains. Successful Web page development may involve the traditional skills of a story teller, writer, poet, copy editor, art director, graphic designer, typographer, illustrator, painter, photographer, and composer, in combination with the newer expertise of the 2D and 3D animator, digital non-linear video editor, software programmer, sound effects designer, cognitive psychologist, and human factors engineer.

Howard Gardner's theory of multiple intelligences identifies seven separate modalities: linguistic, musical, logical-mathematical, spatial, bodily-kinesthetic, and intra personal [Gardner 1983]. It is clear that all modalities are used in

varying degrees in multimedia design. Other useful strategies for teaching multimedia design can be adopted from Donald Norman's identification of the stages of complex learning [Norman 1977] and Seymour Papert's assertion that "We should think of the computer as what you make something out of, or as a medium that gives you the opportunity to express yourself and access what other people have expressed." [Papert 1995]

Because of the diversity of programs at the graduate and undergraduate levels, the university can take a leadership role in pioneering new programs that address the educational requirements of our "digital age." The Computer Applications Option was developed in recognition that computers are being used in novel ways in widely different disciplines. The new Digital Image/Sound and the Fine Arts program was created to offer an educational "blend of computer knowledge and artistic studies." The double major program allows computer scientists to study particular fine arts disciplines, and allows artists to cross over into the more scientific realm of computer science.

This university program differs from short-term, application-specific training by offering an in-depth technical and artistic education requiring for the double major 45 credits in computer science and 45 credits in fine arts. A student can elect to receive either a Bachelor of Science or a Bachelor of Fine Arts degree. In specifying the 39-credit Computer Science Core, two credits in Technical Writing, and a further four credits in Computer Science, the Computer Applications Option provides full flexibility for students to innovatively combine a solid grounding of hardware and software with an application area of their choice.

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The Computer Science Core consists of the following sequence of courses:

Year I

- COMP 228 - System Hardware (3 credits)
- COMP 229 - System Software (3 credits)
- COMP 238 - Mathematics for Computer Science I (3 credits)
- COMP 239 - Mathematics for Computer Science II (3 credits)
- COMP 248 - Introduction to Programming (3 credits)
- COMP 249 - Programming Methodology (3 credits)

Year II

- COMP 352 - Data Structures and Algorithms (3 credits)
- COMP 353 - Files and Databases (3 credits)
- COMP 335 - Introduction to Theoretical Computer Science (3 credits)
- COMP 346 - Operating Systems (3 credits)

Year III

- COMP 326 - Computer Architecture (3 credits)
- COMP 354 - Software Engineering 1 (3 credits)

A two-credit course in technical writing and one four-credit Computer Science Elective taken from courses numbered above 300 complete the 45-credit requirement in Computer Science. The remaining 45 credits can be used to complete a Major or a Minor program in any discipline of Arts and Science, or it can constitute the 45-credit Major in Digital Image/Sound and the Fine Arts. The 45-credit program in Fine Arts is designed so that students enrolled in

the Major in Digital Image/Sound have a range of choices in their first year from introductory courses, which include Photography, Design Art, Interdisciplinary Studies, Computer Music, Film Animation, and Studios in Fine Arts (SFAR) courses. In the subsequent two years, students take advanced courses from the same Fine Arts programs.

Concentration requirements include the following three courses:

- FFAR 250 - Visual and Performing Arts in Canada
(6 credits)
- DFAR 350 - Multi-Media Authoring in the Fine Arts
(6 credits)
- DFAR 450 - Advanced Workshop: Theory and Practice in Digital Image and Sound
(6 credits)

12-15 credits are taken from the following courses:

- DART 200 - Design Art Theory and Practice
(6 credits)
- EAMT 205 - Electroacoustics I
(6 credits)
- FMAN 304 - Animation II
(9 credits)
- IDYS 200 - Studio Seminar in Interdisciplinary Studies I
(6 credits)
- PHOT 200 - Foundations in Photographic Vision: Theory and Practice I
(6 credits)

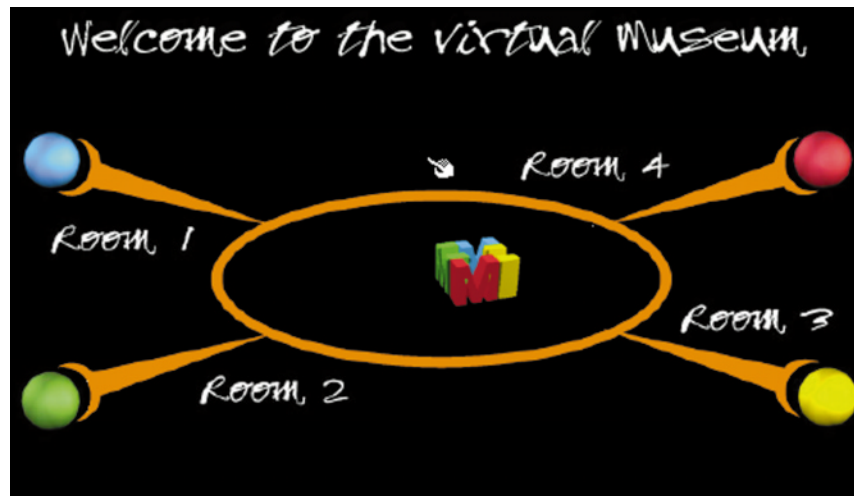
Or a choice from one of the Studio in Fine Arts Courses:

- SFAR 250 - Visual Language as Content
(6 credits)
- SFAR 260 - Integrated Drawing: Intersections
(6 credits)
- SFAR 270 - Extended Studio Practice
(6 credits)

The remaining requirements include an additional 12-15 credits of upper-level courses chosen from the following programs: Design Art, Film Animation, Interdisciplinary Studies, Music, and Photography. The 30-credit minor option in Digital Image/Sound is intended for a limited number of students in Fine Arts who are not enrolled in the Computer Application Option. Similar to the major, it has two required courses (FFAR 250 and DFAR 350). The remaining 18 credits offer a choice of six to 12 credits of the same introductory courses as the major and an additional 6-12 credits of advanced courses to give students a grounding in the aesthetic and technical issues of a particular discipline.

have a background in the fine and performing arts and demonstrate the aptitude for learning the technical skills for multimedia design.

DFAR 350 Multi-Media Authoring in the Fine Arts focuses on teaching Web page design using HTML, multimedia design using Macromedia Director with Lingo scripting and Shockwave, and building virtual worlds using Virtual Reality Modeling Language (VRML). Additional topics include issues in graphic design, color, typography and layout; perception, cognition and human factors; human-computer interface design; navigation; and hypermedia design. Sound digitizing, editing, mixing, and MIDI are also covered as



The Virtual Museum, Paul Orchanian, DFAR 350

Admission requirements for the Computer Science Option include at least two previous courses in calculus and one in linear algebra, a G.P.A. of 3.0 and previous enrollment in provincial (Canada) preparatory programs (CEGEP 10.12) or the equivalent. For the Fine Arts, an application requires a letter of intent, transcripts, and submission of a portfolio of 10-20 slides of visual work and/or a video and/or an audio tape. Students are admitted who

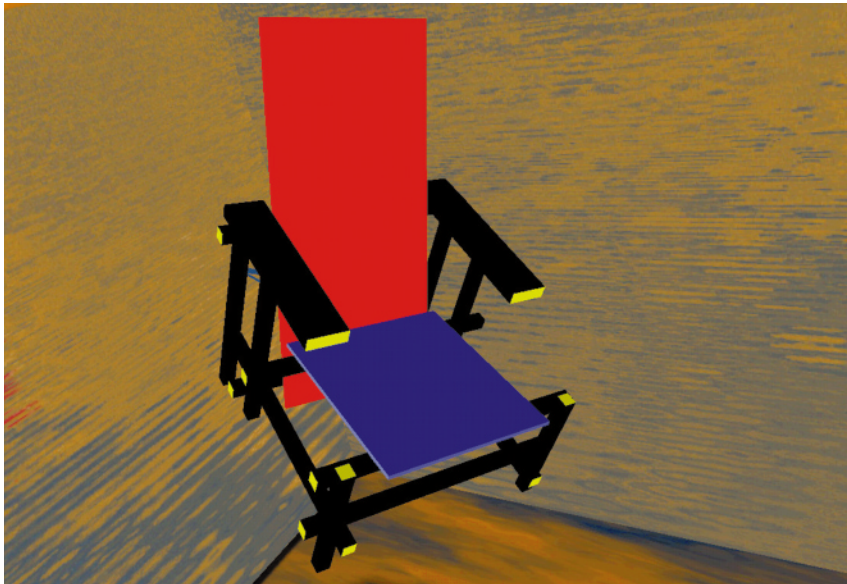
an important part of multimedia design. It is expected that HTML (Hypertext Markup Language) and VRML will be learned by building Web pages and virtual worlds by hand. Other techniques are introduced, such as GIF animations, inline QuickTime, and embedded Javascripts.

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Weekly assignments are to be compiled and presented as an electronic journal and posted on the course Web site at year's end. These include exercises that develop specific knowledge and technical skills according to the current subject under study. There are two minor projects, each four weeks in length. In the first minor project (fall semester), titled "Le Musée Imaginaire," students worked with Macromedia Director to create an imaginary muse-

ed a photograph of one of the classic "De Stijl" chair designs by Gerrit Rietveld, such as the "Blue Red" or "Zig-Zag" chairs, and modeled it in VRML, adding sound, behaviors, animations, and environments. The second major project is a student choice project, which permits students to continue developing their first major project, or continue with the VRML project, or create an entirely new project using a combination of HTML, Javascript,

Montréal Museum of Fine Arts, such as digital scans from the collection and authoritative text in French and English. Successful student projects may be included in the Montréal Musée des Beaux Arts Web Site. In addition, students from the Digital Image/Sound program are participating in a multimedia collaboration between Concordia University and K-12 schools sponsored by the Charles R. Bronfman Foundation and the J. Armand Bombardier Museum and Foundation. Other students enrolled in this program have been awarded contracts by Stentor Communications, an alliance of 11 Canadian telecommunication companies.



Chair-not-a Chair Yves Gigon, DFAR 350

um or a "museum without walls" as an interactive desktop presentation. This minor project was followed by the Fall Major Project I: "Vers un musée virtuel interactif" (Toward an interactive virtual museum). In the traditional museum setting, visitors are normally not allowed to touch the works of art. In the virtual museum, the user is encouraged to "touch" the immaterial objects. In this major project, the basic experience of looking is haptically extended by allowing the user to interact directly with and manipulate the art work. In "Chair-not-a Chair," students select-

Director, and Lingo. Students are required to identify the project as a Web site or a stand-alone desktop presentation presumably for CD or DVD. In effect the minor projects are treated as opportunities to create in-depth experiments, mockups, and prototypes for major projects. The purpose is to build, test, and discover what works or doesn't work technically, cognitively, and aesthetically.

In a special arrangement, students are given access to resources and original source materials provided by the

After reviewing student progress and the difficulties encountered during the first year of the program, the following recommendations for curriculum additions and changes can be identified:

Year I

DFAR 200 - Introduction to Computer Fundamentals in the Fine Arts

(3 or 6 credits)

Covers basic skills such as scanning, image processing, vector and bitmapped graphics file types, digital typography, and fundamentals of digital sound.

DFAR 250 - Introduction to Multi-media Authoring

(6 credits)

Introduction to Macromedia Director using menu-driven authoring. Web page design using Page Mill (or equivalent).

Year II

DFAR 300 – Building Virtual Worlds in VRML

(6 credits)

One year in-depth introduction to VRML with the requirement of building a major project.

DFAR 350 – Intermediate Multi-media Authoring

(6 credits)

In-depth HTML, Director with Behaviors, Lingo, Shockwave, and Lingo for the Internet.

Year III

DFAR 400 – Multi-Media Scripting and programming

(6 credits)

This course separately covers Javascript, Java, and CGI programming (Perl) for multimedia design.

DFAR 450 – Advanced Workshop: Theory and Practice in Digital Image/Sound

(6 credits)

Year-long projects using all authoring tools.

DFAR 460 – Seminar in Critical Issues in Art and Technology

(3 or 6 credits)

This course investigates the theoretical and critical issues surrounding art and technology.

DFAR 498 – Internship Program

(3 or 6 credits)

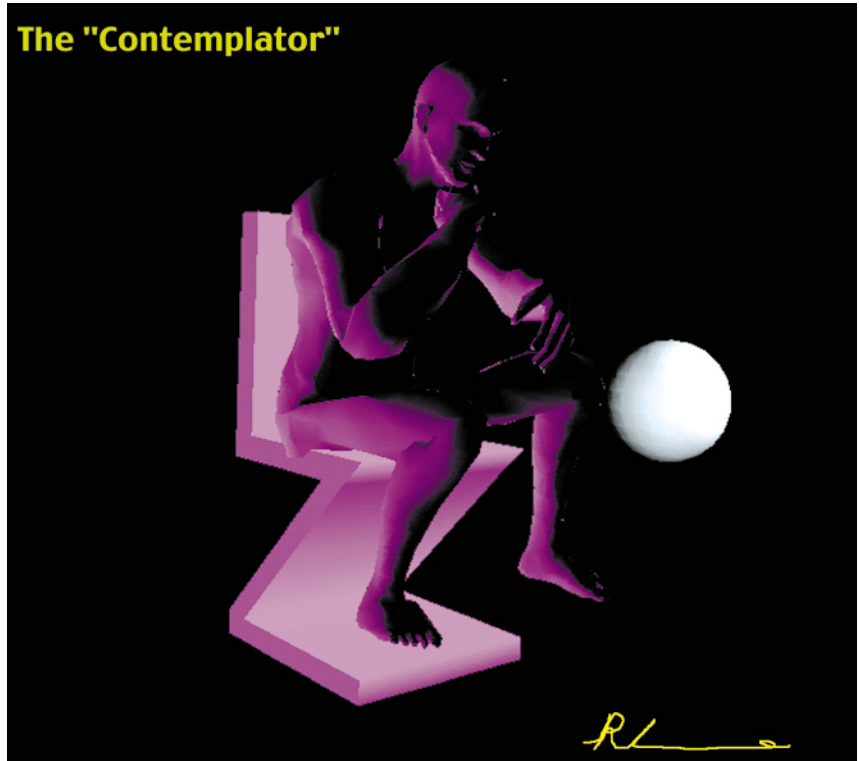
Students volunteer at companies with faculty supervision.

DFAR 499 – Coop Program

(3 or 6 credits)

Students are employed and paid by companies to work on multimedia products.

While it is not possible to cover all the related disciplines in depth, it is clear that the multimedia artist/designer needs to be conversant with a wide range of technical and aesthetic practice. The new program in Digital Image/Sound and the Fine Arts, by offering a double major with Computer Science, provides an important step toward preparing students for a future in multimedia design. Guided by learning theories of Gardner, Norman, and Papert, this program follows the dual principles of "learning by doing" and "user-centered education" in an environment of structured collaboration. [Garvey 1995].



Chair-not-a Chair Roland Lowe, DFAR 350

References

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Norman, Donald (April 11, 1977). *Teaching learning strategies*, Mimeo, University of California, San Diego.

Quoted from *Multimedia Today: The Sourcebook For New Media Power Vol.III, Issue 4-1995 p.38.*