Digital Media Curriculum Development Project

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GOAL: To develop digital media curriculum that integrates science behind the digital media creation for various disciplines.

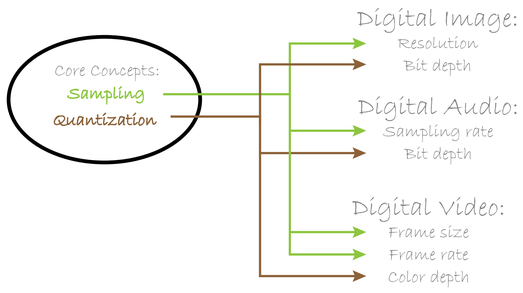
INTENDED OUTCOME: The curriculum allows students who study digital media from many different disciplines, from computer science to digital art and communication, to learn science behind digital media creation.

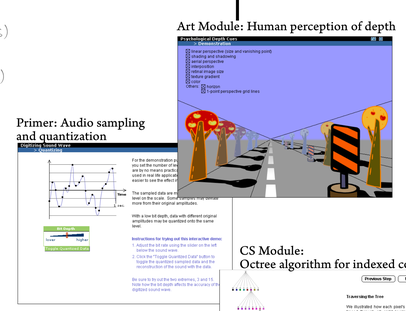
METHODS AND STRATEGIES

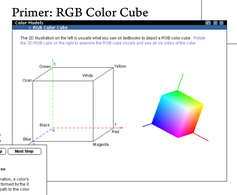
- Map out the common ground of the science of digital media of various perspectives into a primer module, from which branches out into discipline-specific ones

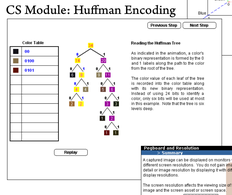
Art Module	Primer (Common Ground)	Computer Science Module
Backgrounds , Chapter 1	Backgrounds , Chapter 1	Backgrounds , Chapter 1
Digital Imaging, Chapter 2 (Concepts)	Digital Imaging, Chapter 2 (Concepts)	Digital Imaging, Chapter 2 (Concepts)
Digital Imaging, Chapter 3 (Applications)	Digital Imaging, Chapter 3 (Applications)	Digital Imaging, Chapter 3 (Applications)
Digital Audio, Chapter 4 (Concepts)	Digital Audio, Chapter 4 (Concepts)	Digital Audio, Chapter 4 (Concepts)
Digital Audio, Chapter 5 (Applications)	Digital Audio, Chapter 5 (Applications)	Digital Audio, Chapter 5 (Applications)
Digital Video, Chapter 6 (Concepts)	Digital Video, Chapter 6 (Concepts)	Digital Video, Chapter 6 (Concepts)
Digital Video, Chapter 7 (Applications)	Digital Video, Chapter 7 (Applications)	Digital Video, Chapter 7 (Applications)
Web Authoring, Chapters 8-10	Multimedia Authoring, Chapters 8-11	Multimedia Authoring, Chapter 8

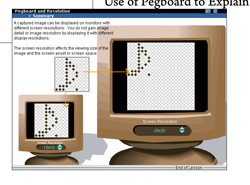
- Connect between concept and application
  Two chapters each media: concept and application
- Use daily life experience to explain abstract scientific concepts
  Examples: pegboard to explain resolution;
  eye signals to explain how information can be encoded in binary notations
  monitoring a puppy's growth to explain sampling and quantization
- Emphasize task-oriented over procedural-oriented learning of application tools
- Mesh in the visual aids with practice exercises or associate them with worksheets to allow practice of RETRIEVAL of knowledge
- Using Conceptual Frameworks in Understanding by identifying











FINDINGS

- Materials that students have found most helpful:
  - Interactive tutorials
  - Use of tangible and concrete examples
  - End-of-chapter review questions
  - Worksheets associated with the interactive tutorials
- Develop strategies to help students learn to learn new software applications on their own
- Methods of Assessment
  Pre- and post-tests are of limited usefulness.
  Recording of on-screen activities and video-taping of students working in groups are found to give most useful information on how students apply the materials to solve problems
- Pre-Test as a useful learning tool by pre-exposing the students to the key terms and concepts

PILOT-TESTING SITES

included 4-year universities, community colleges, high schools, digital art classes, computer science classes, digital media programs. In general, the pre- and post-test results indicated that the students who used the materials were successful in learning that content.

Example quotes of student feedbacks that support some of the findings and guided the revision of the materials:

The illustrated examples, as well as the interactive tutorials, were extremely beneficial. I particularly liked the Review Questions at the end - my brain more efficiently processed the information that I read and stored it in my memory as I completed each question.

"I really enjoyed reading the chapter, because I have always felt somewhat clueless as to the vocabulary used in talking about computers, and now I feel a little more comfortable. I felt this was a helpful introduction and now I'm curious to learn more about how a computer works and I'm more confident about my ability to understand this sort of technical information. The demo involving converting from decimal to binary was useful. The other demos were not particularly helpful in increasing my understanding of the subject matter."

"I enjoy to interactive lesson because it gives me the ability to use the subject matter and concepts in practice; a very helpful visual guide for memory retention."

"Overall it has helped me understand the subject a little better. I have been educated to better improve the work that I do with digital imaging on the computer."

"...Especially when it came to the bit/byte/binary stuff. There was so much of it, and I didn't see how knowing the binary system has much to do with making graphics. But other than that the examples that were there were very helpful for understanding the concepts more."

"I liked the indepth examples to make the concepts seem less confusing. The tutorials also helped for understanding a lot better."

"My students mentioned that they would recognize an obviously complex topic, but that the worksheets occasionally only allowed them to work with trivial cases (or only complex cases). They wanted to see a more in depth transition from trivial cases to complex cases. They also reasoned that the number of questions on a worksheet topic should be inversely proportional to the complexity. That is, give a few more questions on trivial to moderate cases and culminate with one or two complex comprehensive questions."

STEM CONCEPTS & PRINCIPLES INTRODUCED IN THE CURRICULUM

include sampling, quantization, resolution, bit depth, binary notation, color models, aliasing, human perception of depth, relativity of color and value, compression algorithms (JPEG, MPEG, LZW, Huffman encoding), discrete cosine transform in JPEG compression, dithering, histograms, curves and vector graphics, Octree algorithm for indexed color, resampling, convolution, sound wave, MIDI, non-linear companding and μ-Law encoding, Fourier transform in audio, mathematical modeling of audio filters, animation basics, computer programming fundamentals, multimedia authoring, HTML, CSS, DHTML.

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