Digital Library Curriculum Development

JCDL 2006, University of North Carolina at Chapel Hill, NC
Curriculum Development Project

• Collaborative Research launched by:
  - Department of Computer Science, Virginia Tech
  - School of Information and Library Science, University of North Carolina, Chapel Hill

• Three year (2006 - 2008) funded project
Project Teams/NSF Grant

• Project Team at VT (IIS-0535057):
  – PI: Dr. Edward A. Fox (fox@vt.edu)
  – GRA: Seungwon Yang (seungwon@vt.edu)

• Project Team at UNC-CH (IIS-0535060):
  – Co-PI: Dr. Barbara Wildemuth (wildem@ils.unc.edu)
  – Co-PI: Dr. Jeffrey Pomerantz (pomerantz@unc.edu)
  – GRA: Sanghee Oh (shoh@email.unc.edu)
Project links

• Homepage
  http://curric.dlib.vt.edu/DLcurric.html
  - Overview, proposal, progress diary, news & interviews, contact information

• Wiki
  http://curric.dlib.vt.edu/wiki
  - Resources will be added here
  - Coming soon 😊
News and Interviews

- WVTF Public Radio: Morning Edition, "Interview with Dr. Fox" [January 30, 2006]
- VT Collegiate Times article [January 26, 2006]
- UNC Gazette article [January 25, 2006]
- Virginia Tech Computer Science Department News article [January 23, 2006]
- Virginia Tech News article [January 20, 2006]
Development / Evaluation Plan
January 2006 – December 2008

- From research team (VT & UNC)
- From current courses at VT & UNC
- From Advisory Board
- From CC 2001

- CC 2001 context
- Curricular needs
- Student background

- Specific strengths
- Specific weaknesses

- Modules ready for use
- Lessons ready for use

- Modules
- Lessons

- Teacher perceptions
- Student perceptions
- Student outcomes

- At UNC & VT
- At additional universities (in CS & LIS programs)

- Inspection by Advisory Board
- Inspection by external experts
- Inspection by Doctoral Consortium participants
## Project Timeline

<table>
<thead>
<tr>
<th>Activities</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sp</td>
<td>Su</td>
<td>Fa</td>
</tr>
<tr>
<td>Creation of an advisory board</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engagement of experts to assist with module development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of modules</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of lessons within modules</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of 1- and 2-semester courses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preliminary evaluation of modules and lessons by experts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revision of modules and lessons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation of modules and lessons in existing courses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation of modules and lessons in the field</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offering of new courses at UNC &amp; VT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETD, JCDL and Doctoral Consortium</td>
<td></td>
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<tr>
<td>ECDL &amp; SIGIR conferences</td>
<td></td>
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<tr>
<td>ASIS&amp;T conference</td>
<td></td>
<td></td>
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<tr>
<td>ICADL conference</td>
<td></td>
<td></td>
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</table>
What we do:

• Identify, develop and test educational DL modules, guided by
  
  - Experts and international collaborators
  - Computing Curriculum 2001 [6, 7]
  - 5S framework [1,2,3,4]
    (Ex) Module revision in 3/27/06
  
  - Analysis of DL course syllabi
    (Ex) UNC-CH is collecting DL syllabi
    VT collected syllabi from DELOS member institutions in Europe

  - Development of module template
Experts / Advisory board members

Table 3. Experts (all have agreed to assist)

<table>
<thead>
<tr>
<th>Advisory Board</th>
<th>VT</th>
<th>UNC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dan Atkins, U. Michigan</td>
<td>Steven Edwards, CS</td>
<td>Catherine Blake, SILS</td>
</tr>
<tr>
<td>Christine Borgman, UCLA</td>
<td>Roger Ehrich, CS</td>
<td>Laura Gasaway, Law School</td>
</tr>
<tr>
<td>Lillian Cassel, Villanova</td>
<td>Weiguo Fan, ACIS</td>
<td>Jane Greenberg, SILS</td>
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<tr>
<td>Michael Christel, CMU</td>
<td>Steve Harrison, CS</td>
<td>Stephanie Haas, SILS</td>
</tr>
<tr>
<td>Raya Fidel, U. Washington</td>
<td>Gail McMillan, Library</td>
<td>Brad Hemminger, SILS</td>
</tr>
<tr>
<td>Richard Furuta, Texas A&amp;M University</td>
<td>Chris North, CS</td>
<td>Thomas James, Dean, School of Education</td>
</tr>
<tr>
<td>Elizabeth Liddy, Syracuse University</td>
<td>Manuel Pérez-Quinónez, CS</td>
<td>Paul Jones, Director, ibiblio; SILS &amp; School of Journalism &amp; Mass Communication</td>
</tr>
<tr>
<td>Clifford Lynch, CNI</td>
<td>Naren Ramakrishnan, CS</td>
<td>Diane Kelly, SILS</td>
</tr>
<tr>
<td>Kurt Maly, ODU</td>
<td>Deborah Tatar, CS</td>
<td>Gary Marchionini, SILS</td>
</tr>
<tr>
<td>Javed Mostafa, Indiana</td>
<td>Layne Watson, CS</td>
<td>Montek Singh, CS</td>
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<tr>
<td>Tefko Saracevic, Rutgers</td>
<td></td>
<td>Natasha Smith, Library</td>
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<tr>
<td>Linda Smith, UIUC</td>
<td></td>
<td>Helen Tibbo, SILS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steve Weiss, CS</td>
</tr>
</tbody>
</table>
Selected International Collaborators

• **India**
  Dr. Arun Kumar Chakraborty  
  – Bose Institute, Kolkata, India

• **Brazil**
  Dr. Ricardo da Silva Torres  
  – State University of Campinas (UNICAMP), SP, Brazil
What we do:

- Identify, develop and test educational DL modules, guided by
  - Experts and international collaborators
  - Computing Curriculum 2001 \([6,7]\)
  - 5S framework \([1,2,3,4]\)
    (Ex) Module revision in 3/27/06
- Analysis of DL course syllabi
  (Ex) UNC-CH is collecting DL syllabi
  VT collected syllabi from DELOS member institutions in Europe
- Development of module template
<table>
<thead>
<tr>
<th>IM1. Information models and systems*</th>
<th>IM8. Distributed DBs</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM2. Database systems*</td>
<td>IM9. Physical DB design</td>
</tr>
<tr>
<td>IM3. Data modeling*</td>
<td>IM10. Data mining</td>
</tr>
<tr>
<td>IM4. Relational DBs</td>
<td>IM11. Information storage and retrieval</td>
</tr>
<tr>
<td>IM5. Database query languages</td>
<td>IM12. Hypertext and hypermedia</td>
</tr>
<tr>
<td>IM6. Relational DB design</td>
<td>IM13. Multimedia information &amp; systems</td>
</tr>
</tbody>
</table>
What we do:

• Identify, develop and test educational DL modules, guided by
  - Experts and international collaborators
  - Computing Curriculum 2001 \([6,7]\)
  - **5S framework** \([1,2,3,4]\)
    (Ex) Module revision in 3/27/06
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5S Framework

- Developed by Digital Library Research Laboratory (DLRL) at Virginia Tech
- Strong foundation for DL module development
- Captures entities and medium involved in DLs.
- The five S’s
  - streams, structures, spaces, scenarios, societies
5S Framework

- “Streams”
  - All types of contents
  (as well as communications and flows over networks, or into sensors, or sense perceptions)

- “Structures”
  - Organizational schemes
  (including data structures, databases, and knowledge representations)
5S Framework

- **“Spaces”**
  - 2D and 3D interfaces, GIS data, representations of documents and queries.
- **“Scenarios”**
  - System states and events, but also can represent situations of use by human users (or machine processes, yielding services or transformations of data).
- **“Societies”**
  - Both software “service managers” and fairly generic “actors” who could be (collaborating) human (users).
## Table 7. The 5 Ss

<table>
<thead>
<tr>
<th>Ss</th>
<th>Examples</th>
<th>Formalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streams</td>
<td>Text; video; audio; image</td>
<td>Sequence (list)</td>
</tr>
<tr>
<td>Structures</td>
<td>Collection; catalog; hypertext; document; metadata</td>
<td>Graph, Function, Relation</td>
</tr>
<tr>
<td>Spaces</td>
<td>Used in indexing, browsing, and searching services – as well as interfaces</td>
<td>Set (vector, topological, measurable, measure, probability spaces)</td>
</tr>
<tr>
<td>Scenarios</td>
<td>Searching, browsing, recommending</td>
<td>States, events, sequences (lists)</td>
</tr>
<tr>
<td>Societies</td>
<td>Service managers (software), Actors (learners, teachers, etc.)</td>
<td>Tuple (relating events and actions)</td>
</tr>
</tbody>
</table>
DL Topics in 19 Modules (original)
Module Revision in 3/27/06
Organized using 5S framework

STREAM
1. Collection Development
   – Digitization
   – Document and E-publishing Markup
   – Harvesting
2. Digital objects/Composites/Packages
   – Text Resources
   – Multimedia streams/structures, Captures/representation, Compression/coding
     • Content-based analysis, Multimedia indexing
     • Multimedia presentation rendering

STRUCTURE
3. Metadata, Cataloging, Author submission
   – Thesauri, Ontologies, Classification, Categorization
   – Bibliographic information, Bibliometrics, Citations
4. Architecture (agents, buses, wrappers/mediators), Interoperability
Module Revision 06/01/06

SPACE
5. Spaces (conceptual, geographic, 2/3D, VR)
   - Storage
   - Repositories, Archives

SENRARIOs
6. Services (searching, linking, browsing, etc.)
   - Info needs, Relevance, Evaluation, Effectiveness
   - Search & search strategy, Info seeking behavior, User modeling, Feedback
   - Routing, Filtering, Community filtering
   - Sharing, Networking, Interchange
   - Info summarization, Visualization

7. Archiving and preservation integrity (ILS)

SOCIETIES
8. Intellectual property rights management, Privacy, Protection (watermarking) (ILS)
9. Social issues / Future DLs
What we will do:

- Course Development (summer 2006)
  - 1-semester and 2-semester courses will be based on the developed modules

- Courses and modules will be...
  - Evaluated by experts
  - Pilot-tested in CS and LIS courses by the U.S. institutions and our international collaborators in India (Dr. Arun Kumar Chakraborty) and Brazil (Dr. Ricardo da Silva Torres).
## Dissemination Efforts

<table>
<thead>
<tr>
<th>Conference</th>
<th>Type</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>JCDL 06</td>
<td>Curriculum Development for Digital Libraries (paper)</td>
<td>Accepted</td>
</tr>
<tr>
<td>ETD Symposium 06</td>
<td>Digital Library Curriculum Development: Enhancing Education and Comprehension of NDLTD (paper)</td>
<td>Accepted</td>
</tr>
<tr>
<td>ICADL 06</td>
<td>Collaborative Research: Community-Oriented Curriculum Development for Digital Library Education (paper)</td>
<td>Planned</td>
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</tbody>
</table>
Ascertaining Priority Topics

- We’ve manually classified and analyzed publications using 9-Modules(revised):

<table>
<thead>
<tr>
<th>Source</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proceedings JCDL ’01 – ’05</td>
<td>354</td>
</tr>
<tr>
<td>Proceedings ACM DL ’96 – ’00</td>
<td>189</td>
</tr>
<tr>
<td>Magazine articles D-Lib ’95 – ‘06</td>
<td>521</td>
</tr>
<tr>
<td>Session titles JCDL, ACM DL, ECDL</td>
<td>264</td>
</tr>
</tbody>
</table>
• Analysis Results:

- Total of 543 proceedings:
  Most popular topics were architecture (module 4) and services (module 6)
Distribution of D-Lib Magazine Articles across Module Topics

Number of D-Lib articles

Module ID

1 2 3 4 5 6 7 8 9
Analysis Results:

- Total of 521 articles:
  Most popular topics were architecture (module 4), services (module 6) and social issues (module 9)
Distribution of Session Titles across Module Topics

Number of panel sessions

- JCDL & ACM DL
- ECDL
- ICADL

Module ID: 1 2 3 4 5 6 7 8 9
• Analysis Results:

- Total of 264 session titles (JCDL, ECDL, ICADL):
  Most popular topic was services (module 6)
  followed by architecture (module 4)
What we do:

- Identify, develop and test educational DL modules, guided by
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  - 5S framework
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- Development of module template
Resource Analysis
- European DL course syllabi -

- DL-related course syllabi were collected from - DELOS member institutions in Austria, Czech Republic, United Kingdom, Switzerland, Norway, and Germany
- English resources (reference papers, textbooks, online demo) were retrieved from the syllabi and organized into tables.
- We will expand this effort to include courses in the U.S., Asia, and Oceania.
Links to Resources

Excel files can be downloaded from the links below.

- Corpus Table Download Link
  http://curric.dlib.vt.edu/DLcurric/syllabiCollection/European/v1/EuropeanDLCourseCorpusTable-v1.xls

- Textbook Analysis Table Download Link
  http://curric.dlib.vt.edu/DLcurric/syllabiCollection/European/v1/EuropeanDLCourseBookAnalysisTable-v1.xls

- Reference Paper Analysis Table Download Link
  http://curric.dlib.vt.edu/DLcurric/syllabiCollection/European/v1/EuropeanDLCoursePaperAnalysisTable-v1.xls

- Online Documents and Tutorials Analysis Table Download Link
  http://curric.dlib.vt.edu/DLcurric/syllabiCollection/European/v1/EuropeanDLCourseOnlineDocTutorialsAnalysisTable-v1.xls
## Selected Corpus Table

<table>
<thead>
<tr>
<th>Country</th>
<th>University / Institution</th>
<th>Course Title</th>
<th>Books</th>
<th>Papers</th>
<th>Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>Institute for Information Systems and Computer Media - IICM</td>
<td>Multimedia Information Systems 2</td>
<td>0</td>
<td>0</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Information Visualisation</td>
<td>22</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Vienna University of Technology</td>
<td></td>
<td>Informationsvisualisierung</td>
<td>7</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Czech Republic</td>
<td>Masaryk University of Brno</td>
<td>Informatics Colloquium</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>Multimedia data indexing</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Germany</td>
<td>Max-Planck-Institut für Informatik</td>
<td>Information Retrieval and Data Mining WS 2005/06</td>
<td>18</td>
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<td>Information Retrieval and Data Mining WS 2002/2003</td>
<td>6</td>
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<td></td>
<td>Universität Duisburg-Essen</td>
<td>Information Regrieval</td>
<td>3</td>
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## Selected Textbooks

<table>
<thead>
<tr>
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<th>Topic</th>
<th>Title</th>
<th>Author</th>
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</thead>
<tbody>
<tr>
<td>11</td>
<td>Information Retrieval</td>
<td>Modern Information Retrieval</td>
<td>Ricardo Baeza-Yates, Berthier Ribeiro-Neto</td>
</tr>
<tr>
<td>5</td>
<td>Information Retrieval</td>
<td>Information Retrieval</td>
<td>van Rijsbergen C.J.</td>
</tr>
<tr>
<td>5</td>
<td>Searching/Cognition</td>
<td>Finding Out About: Search Engine Technology from a cognitive Perspective</td>
<td>Richard, K. Belew</td>
</tr>
<tr>
<td>3</td>
<td>Information Retrieval</td>
<td>HySpirit - Integrating Information Retrieval and Database Technologies</td>
<td>Roelleke T., Lalmas M. and Luebeck R.</td>
</tr>
<tr>
<td>3</td>
<td>Information Retrieval</td>
<td>Introduction to modern information retrieval.</td>
<td>Chowdhury, G. G.</td>
</tr>
<tr>
<td>2</td>
<td>Classification</td>
<td>Pattern Classification</td>
<td>Richard O. Duda, Peter E. Hart, David G. Stork</td>
</tr>
<tr>
<td>2</td>
<td>Language Processing</td>
<td>Foundations of Statistical Natural Language Processing</td>
<td>Christopher D. Manning, Hinrich Schütze</td>
</tr>
</tbody>
</table>
## Selected Reference Papers

<table>
<thead>
<tr>
<th>Topic</th>
<th>Title</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database</td>
<td>Maintenance of Materialized Views: Problems, Techniques, and Applications</td>
<td>Ashish Gupta et al.</td>
</tr>
<tr>
<td>Digital Library</td>
<td>A Spectrum of Interoperability. The Site for Science Prototype for the NSDL.</td>
<td>William Y. Arms et al.</td>
</tr>
<tr>
<td>Digital Library</td>
<td>Automated Digital Libraries. How Effectively can Computers be used for the Skilled Tasks of Professional Librarianship?</td>
<td>William Y. Arms</td>
</tr>
<tr>
<td>Digital Library</td>
<td>Digital Libraries, value, and productivity.</td>
<td>Wiederhold, G.</td>
</tr>
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</table>
## Online Software, Demos, Tutorials

<table>
<thead>
<tr>
<th>Topic</th>
<th>Title</th>
<th>URL</th>
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<tbody>
<tr>
<td></td>
<td>Visual knowledge builder</td>
<td><a href="http://www.csdl.tamu.edu/VKB/vkb_download.html">http://www.csdl.tamu.edu/VKB/vkb_download.html</a></td>
</tr>
<tr>
<td>Database</td>
<td>Agile Database Techniques</td>
<td>[<a href="http://www.ambyst.com/agile(DatabaseTechniques.html">http://www.ambyst.com/agile(DatabaseTechniques.html</a>](<a href="http://www.ambyst.com/agile(DatabaseTechniques.html)">http://www.ambyst.com/agile(DatabaseTechniques.html)</a></td>
</tr>
<tr>
<td></td>
<td>Datenbanken Artikel</td>
<td><a href="http://onjava.com/topics/java/jdbc_sqlij">http://onjava.com/topics/java/jdbc_sqlij</a></td>
</tr>
<tr>
<td></td>
<td>Hibernate Your Data</td>
<td><a href="http://www.onjava.com/pub/a/onjava/2004/01/14/hibernate.html">http://www.onjava.com/pub/a/onjava/2004/01/14/hibernate.html</a></td>
</tr>
</tbody>
</table>
• Taxonomy Development:

- By examining the syllabi and current DL courses, we developed a Taxonomy of DL Educational Resources
Textbook on DLs

• PI Fox, along with co-author Gonçalves, is preparing a textbook on DLs based on 5S
• This work will rely on the 5S framework to ensure that it provides integrated coverage of the many concepts related to DLs
• Fox and Gonçalves are focused on a book for teaching as well as reference
Textbook Outline

• Ch. 1. Introduction (Motivation, Synopsis)
• Part 1 – The “Ss”
  – Ch. 2: Streams
  – Ch. 3: Structures
  – Ch. 4: Spaces
  – Ch. 5: Scenarios
  – Ch. 6: Societies
Textbook Outline

• Part 2 – Higher DL Constructs
  – Ch. 7: Collections
  – Ch. 8: Catalogs
  – Ch. 9: Repositories and Archives
  – Ch. 10: Services
  – Ch. 11: Systems
  – Ch. 12: Case Studies
Textbook Outline

• Part 3 – Advanced Topics
  – Ch. 13: Quality
  – Ch. 14: Integration
  – Ch. 15: How to build a digital library
  – Ch. 16: Research Challenges, Future Perspectives

• Appendix
  – A: Mathematical preliminaries
  – B: Formal Definitions: Ss
  – C: Formal Definitions: DL terms, Minimal DL
  – D: Formal Definitions: Archeological DL
  – E: Glossary of terms, mappings
What we do:

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  - Computing Curriculum 2001 [6,7]
  - 5S framework [1,2,3,4]
    (Ex) Module revision in 3/27/06
  - Analysis of DL course syllabi
    (Ex) UNC-CH is collecting DL syllabi
    VT collected syllabi from DELOS member institutions in Europe
  - Development of module template
Module Template

• Module Design is based on the resources below and the UNC’s module template

1. Yue-Ling Wong, Jennifer Burg, and Leah McCoy, “Integrated Digital Media Curriculum Development Project” Supported by the National Science Foundation under Grant No. DUE-0340969, from Jan 2004 - Dec 2006. The project homepage URL is http://digitalmedia.wfu.edu/project/digital-media-curriculum-development/textbased-index.html


3. Multimedia Systems course website, Department of computer science at University of Victoria, British Columbia, Canada. URL: http://www.csc.uvic.ca/courses/spring2004/csc/461-561.html
Module Template

- VT Template + UNC Template - June 2, 2006 (draft)

1. Module name
2. Learning objectives
3. Level of effort required (in-class and out-of-class time required for students)
4. Prerequisite knowledge required (completion optional)
Module Template

5. Relationships with other modules
6. 5S characteristics of the module
7. Introductory remedial instruction
   (completion optional: intended to address the prerequisite knowledge/skills required)
8. Resources (textbooks, required and optional readings for instructors and students)
   → plan A: all resources of the module are here
Module Template

9. Body of knowledge (Theory + Practice)
Topics might be skipped or studied in different orders

Topic 1
- Theories and background knowledge of the topic
- Learning activities
  - Chapters in the textbook / presentation slides
  - Interactive demo
- Resources → plan B: each topic has its resources
  - Reference papers (relevant parts might be marked with SI tool)
  - Advanced reading
  - Worksheets

Topic 2
....
Topic 3
....
Module Template

10. Concept map (created by students)
11. Exercises / Learning activities
12. Evaluation of learning outcomes
13. Glossary
14. Useful links
Digital Media Material
-From Wake Forest Univ.-

- Homepage: 
  http://digitalmedia.wfu.edu/project/digital-media-curriculum-development/textbased-index.html

Call for Applications for Pilot-testing Site
If the digital media curriculum material at this site meets your needs and you would like to use it in your courses, please consider participating in pilot-testing. Click here to find out more about pilot-testing the material and apply online.
Primer: expand all | collapse all

- Chapter 1. Background
- Chapter 2. Fundamentals of Digital Imaging
- Chapter 3. Capturing and Editing Digital Images
- Chapter 4. Fundamentals of Digital Audio
- Chapter 5. Capturing and Editing Digital Audio
- Chapter 6. Fundamentals of Digital Video
- Chapter 7. Digital Video Production and Post-Production
- Chapter 8. Interactive Multimedia Authoring

CS Module: expand all | collapse all

- Chapter 1. Digital Data Representation and Communication
- Chapter 2. Digital Image Representation
- Chapter 3. Digital Image Processing
- Chapter 4. Digital Audio Representation
- Chapter 5. Digital Audio Processing
- Chapter 6. Digital Video Representation
- Chapter 7. Digital Video Processing
- Chapter 8. Multimedia Programming
Topic Expanded

CS Module: expand all | collapse all

- Chapter 1. Digital Data Representation and Communication
- Chapter 2. Digital Image Representation
- Chapter 3. Digital Image Processing
- Chapter 4. Digital Audio Representation
- Chapter 5. Digital Audio Processing
  - [Chapter 5 Digital Audio Processing (text)] posted 08-16-2005
  - [File Size and Data Transfer Rate (worksheet)] posted 02-20-2005
  - Audio Dithering
    - [Interactive] posted 02-20-2005
    - [Mathematical Modeling (worksheet)] posted 02-20-2005
  - Noise Shaping
    - [Mathematical Modeling (worksheet)] posted 08-16-2005
  - Non-Linear Companding and mu-Law Encoding
    - [Interactive] posted 02-20-2005
    - [Mathematical Modeling (worksheet)] posted 02-20-2005
    - [Implementing mu-Law Encoding (programming worksheet) (worksheet)] posted 11-04-2005
    - [Audio Processing: Adobe Audition (worksheet)] posted 02-20-2005
- Chapter 6. Digital Video Representation
- Chapter 7. Digital Video Processing
- Chapter 8. Multimedia Programming
Summary

- Identify, develop and test educational DL modules, guided by
  - Experts and international collaborators
  - Computing Curriculum 2001
  - 5S framework
    (Ex) Module revision in 3/27/06
  - Analysis of DL course syllabi
    (Ex) UNC-CH is collecting DL syllabi
      VT collected syllabi from DELOS member institutions in Europe
  - Development of module template
Discussion

1. Are identified modules reasonable?
   (e.g., creation of a module for DL evaluation, case studies, and other DL application)

2. Is the draft module template too complicated?

3. How to prepare resources?
   - Use of publicly-available materials (e.g., Digital Media materials from Wake Forest University)

4. How to make the flow between modules natural in a course?
References


References


Thank you!
Extras