ChemPRIME Wiki-text and ChemPaths
Online Student Portal from ChemEd DL

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Outline

- Definition of Needs
- Outline of Current Approaches
- Our Approach
  - What is ChemPRIME?
  - What is ChemPaths?
  - What is the role of the ChemEd DL?
- Questions to Guide Design & Feedback
- Other Avenues of Discussion & Future Directions
- Conclusion
Definition of Needs

- Instructors cover material in their courses according to various pedagogical approaches.
- Students learn well from relevant case-studies and real-world examples.
- Not all students are interested in the same example cases.
- Meta-cognition requires interactivity.
Present Approach

- Instructors cover material in their courses according to various pedagogical approaches.
  - Textbook, or institutional syllabus

- Students learn well from relevant case-studies and real-world examples.
  - Textbook inserts, home-made tutorials, in-class demos

- Not all students are interested in the same example cases.
  - Over the course of a semester cover a few different areas

- Meta-cognition requires interactivity.
  - Engaging online material, in-class participation, interactive homework

Specific solutions to various needs
ChemPRIME

- Chemical Principles through Multiple Exemplars
- A digital copy of *Chemistry* by Moore, Davies and Collins
  - CoreChem
  - Provides a cohesive structure
  - Standard formalism
    - \([\text{HCl}]; \{\text{HCl}\}; C_{\text{HCl}}\)
- “The Chemistry behind your favorite subject”
  - Biology
  - Sports
  - Physics
  - “Tracks”
Planning a Course?

- **Which book to use?**
  - Does it cover what you want?
  - Are modern examples available?
  - Does “Real World” look like your High School Years?
Let’s take a look…

http://wiki.chemprime.chemeddl.org
How was it built?

- Scanners
- OCR – Optical Character Recognition
- Word Processing
- Exporting to Wiki
- Upgrade text/images
- Adding Jmol for Molecules
- Incorporating videos
- Building navigable interface
- Writing Exemplars…

Jule Ober & Others

Adam Hahn
Tim Wendorff
An Online Textbook

- Hardcopy Textbook
  - Table of Contents
  - Content/Layout of Sections
  - Problems & Assessment
  - Multimedia Supplements

- Online “Textbook”
  - Architecture of Site
  - Page Layout/Content
  - Problems & Assessment
  - Multimedia/Interactivity
Schema in Space

- Visuospatial Space
  - Design principles
  - 2D/3D
  - Interlinked connections

- Semantic Space
  - HyperText (http)
  - Constructionist/Schema theory
  - Words and Concepts are ‘mapped’

Wu & Shah, 2004; Dillon et al. 1993; Yang, 2001
Questions to Guide Design

- Broader definition from Wu & Shah, incorporating language from the realm of hypertext (Yang):
  - Provide multiple representations and descriptions of concepts.
  - Make linked referential connections visible among descriptions as well as among concepts.
  - Present the dynamic and interactive nature of chemical phenomena as well as the interlinked nature of chemical knowledge itself.
  - Promote the transformation between 2-D and 3-D.
  - Reduce cognitive load by making information explicit and integrated; likewise, make navigation focused.

- Apply these to the four aspects of a textbook…

Wu & Shah, 2004; Dillon et al. 1993; Yang, 2001
Questions to Guide Design

- Present the dynamic and interactive nature of chemical phenomena as well as the interlinked nature of chemical knowledge itself.

Architecture      Layout      Assessment      Interactivity

Can students & instructors manipulate, control, or edit multiple representations?

Wu & Shah, 2004; Dillon et al. 1993; Yang, 2001
The Role of The ChemEd DL…

Periodic Table Live!
Streaming Video
Jmol with ab initio data

JCE DLib: DUE-022624
Images: MDR-9154132
ChemEd DL: DUE-0632303
ChemPRIME: DUE-0837607
Chemical Education Digital Library

- Not a textual reference library
- Data Library
  - Standard Values
    - Homework? Sample Problems?
    - Graphing? Lab?
  - Question Repository
    - Houses JCE Qbank & other questions
- Structures
  - Over 1000 molecules (chosen for their pedagogical use)
  - \textit{ab initio} calculations (optimized geometry, frequencies, IR, MOs)
- Videos, Animations, Tutorials
- Links Other Online Resources
How was it built?

- Instructors choose their own path through the various CoreChem and Exemplar pages
- A php-wrapper embeds the text from a wiki, along with semantic links to related material
  - Within ChemPaths
  - Other Exemplar Tracks
  - Other NSDL Resources (limited use currently)
- ChemEd DL resources *fully* integrated:
  - Periodic Table Live!
  - Models 360 data
  - Glossary
  - Other Tutorial Pages
  - Images
  - QBank
Let’s take a look…

Sample Question in Moodle CMS
Student Comments

What was helpful?

“Being able to access required reading and homework almost anywhere. You can't forget your online textbook.” – P68

“The availability and amount of resources increased greatly.” – P24

What did you find that wasn’t adequately replaced?

“Mobility.” – P105

“The ability to have it right there in front of you. You just can't beat a traditional textbook.” – P188

“portability, readability, bookmarks and highlighting” – P36

All of these students are from the lecture which used ChemPaths
Would you recommend it?

To what extent would you recommend ChemPaths be used in future __ courses?

1 - It should not be used at all.

2 - It should be made available, but should not contain any information required for the course.

3 - It should be used to offer required information in addition to the traditional textbook.

4 - It should be used instead of requiring a traditional textbook.

5 - No preference.
Other Directions

- Diigo: Social Bookmarking, Highlighting & Annotating
- Quantitative Testing (Standardized Test Scores)
- The “no-textbook” group (around 25% of students)
- Pathway Analysis (how many students stick to the path?)

http://www.chemeddl.org
Thank you for your attention!

http://chemed.chem.wisc.edu/chempaths
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