

Untethering Lab Experiences in General Chemistry with Mobile Devices to Help Link Concepts in Lecture (09-09-2013, http://users.ipfw.edu/linn/CHEMED_poster_linn.pdf)



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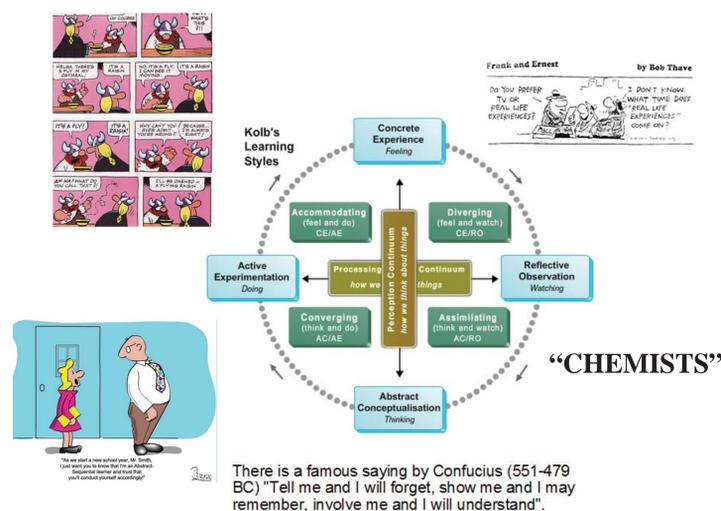
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Abstract:

Chemists tend to be “assimilators” in terms of Kolb’s terminology for the learner. [1-2] Research has shown that more in-depth learning is facilitated when learners can adapt to new learning styles; thus, there are good reasons to provide students with experiential learning. Currently the lab exercises provided in general chemistry are useful only to a point, and do not give our students a wide range of empirical learning. Our goal has been to provide labs that stretch our students to become more engaged with the learning process, to ask questions at each stage, and to provide solutions which they “discover”. Delivering electronic lab manuals (ELM) and electronic lab notebooks (ELN) on mobile devices represents potentially an efficient and innovative mode to accomplish this. This project assesses: 1) video production and communication needs for the ELM in ePub format; 2) how to connect concepts between lab and lecture; and, 3) whether making these connections translates into better comprehension of concepts entailing general chemistry.



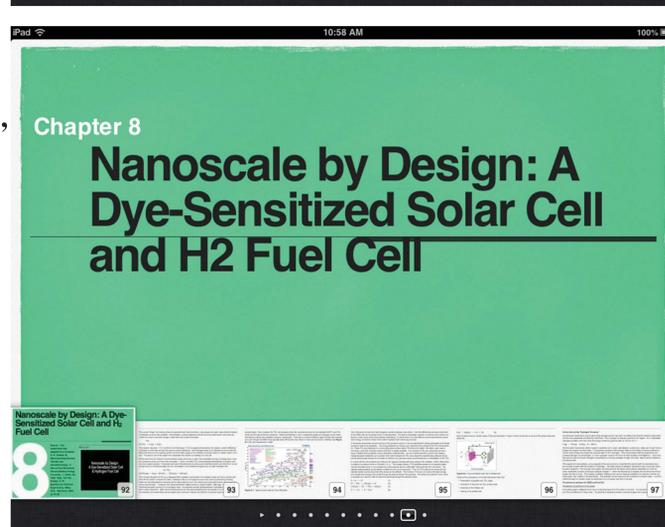
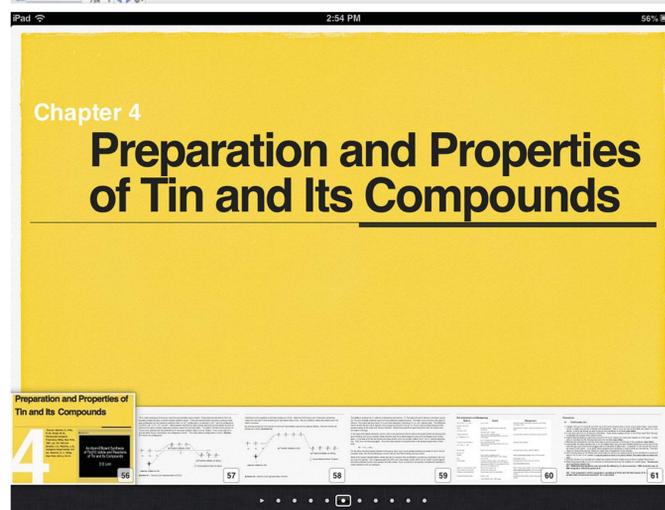
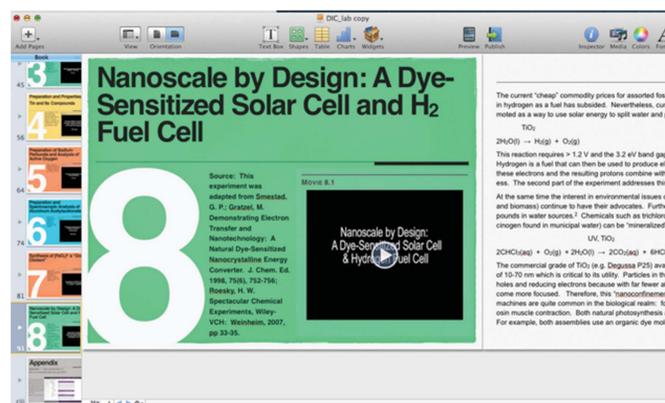
Strategy: “Why Succumb to Gadgetry?”

A more interesting question is “what motivates the ‘Net’ generation?”

- Accustomed to instant gratification and “always-on” connection
- Use the web for 1) extending friendships; 2) interest-driven, self-directed learning; 3) as a tool for self-expression
- Constantly connected, creating, and multitasking and using multimedia — everywhere except in school
- Want coaching but from elders who don’t “talk down” to them
- Want to make a difference in the world and do interesting/worthwhile work

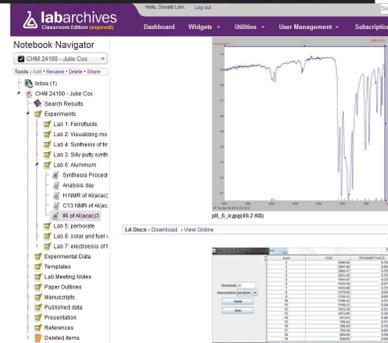
Implementation:

The E-Lab Manual: “Descriptive Inorganic Chemistry Lab”, D. Linn, 2013. published for the iPad on iTunesU using the iBook software application.



E-Lab Notebook:

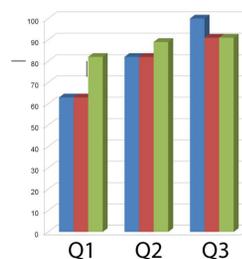
LabArchives.com. Features an electronic laboratory notebook which is always ‘on’ and functional on the mobile devices such as iPads. The cost is competitive with print.



Plan to Assess Learning Skills & Subject Mastery:

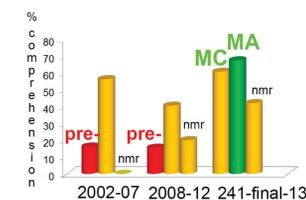
Phase I (assess video production and communication needs):

- Q1- Watching the video would be more useful to me than reading a textual description.*
Q2- The video has brought to life some feature(s) on the descriptive chemistry provided in lecture.
Q3-After watching the video I would be more competent in performing the lab.



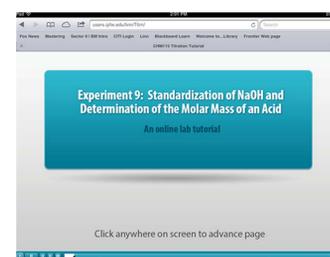
Phase II (probe more deeply into sophomore primary learning objectives):

Measurement of these activities is accomplished using pre- & post-tests in CHM 241. A catalogue of 23 questions on chemistry concepts (electronic struc., bonding, redox, etc.) and NMR covered in CHM 241 was used to access % comprehension (red=pre; green = post)



Phase III (probe more deeply into larger participant pool):

Measurement of these activities will be accomplished using videos demonstrations which contain pre-lab quizzes. Other classes only use the lab manual and take conventional pre-lab quizzes. The former activities are created in Adobe Captivate and delivered via a learning management system (LMS) and scores collected. The performance data collected for students who have done the video presentation/pre-lab quiz vs. traditional pre-lab quiz will be compared to determine whether there are measurable differences.



<http://users.ipfw.edu/linn/Titrm>



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References:

- [1] David A Kobe, Richard E. Boyatzis and Charalampos Mainemelis In R. J. Sternberg and L. F. Zhang (Eds.), Perspectives on cognitive learning, and thinking styles. NJ: Lawrence Erlbaum, 2000.
- [2] David A. Kolb. Experiential learning: Experience as the source of learning and development. New Jersey: Prentice-Hall, p.14, 1984.