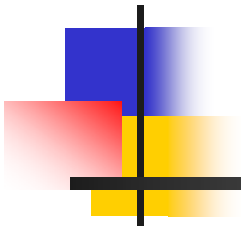

PER Seminar

Group Meeting

Monday
November 09, 2009

Mojgan

1- Two site visits completed (Marquette and La Crosse)

2- Data analysis completed for NOVA and NON-NOVA (Edgewood College)

3-Developing new content questions (Astronomy, Geology, Micro Biology and Physics of sound, color and lenses for recent visits

4- Completing three first chapters of my thesis to prepare for my oral exam

Nasser: PMI Project

- Still working on writing a Paper on the Speed of Light Capstone Project.
- Reading papers related to Complex Problem Solving
  - Unstructured Problems
  - Project Based learning
  - Group/Team Problem solving
- Working on having all 4 Capstone Projects ready for PMI implementation in Spring 2009
  - Speed of Light
  - Frank Hertz
  - Saturated Absorption
  - X-ray Spectroscopy
- Prepare Pre- and Post-test questions for each Capstone Project.
- Improve on guiding questions for each capstone project.

Nakamura/Pathway Active Learning Environment Update

Activities:

- Recording Level II Responses from Nasser
- Editing Chris' Level II responses
- Revising Chris' Level II images
- Working out videos for Chris Level III
- Combining and looking at everybody's question lists (Thanks Everybody!)

Research Updates (11/09/09) – Dong-Hai

- Started interview 3 on Ampere's law:

$$\oint_{Amperian\ loop} \vec{B}.\vec{ds} = \mu_0 i_{enclosed}$$

- Observation: Students seemed not familiar with this kind of problems, especially the line integral and the integral of *j.dA* → impossible to get students understand the physics of the problems without making the interview a real tutoring session.

- Reasons: only 1 homework set on Ampere's law – 1 similar problem and 2 other relevant problems – not enough to give students a sense of the law.

- Solution: Change problems after 4 interviews: break each problem into 2 parts and give cross-sectional view of the wire.

- Problems for interview 4: Induction and/or RLC circuits.

PROBLEMS FOR INTERVIEW 4

Problem 1

The current in a series RLC circuit reaches its maximum amplitude of I_{max} = 2 A when the driven angular frequency is $\omega_0 = 5.10^4$ rad/s. The emf amplitude is 100V and the capacitance is 0.4 μF. Find R and L.

Problem 2

The current amplitude I versus driving angular frequency ω_d for a driven series RLC circuit is given in the graph below. The inductance is 200 μH and the emf amplitude is 8.0 V. Find C and R.

Problem 3

The current amplitude I(ω) (in Amperes) of a series RLC circuit depending on the driving angular frequency ω (in radian/second) is given as follow:

$$I(\omega) = \frac{30}{\sqrt{900 + \left(5.10^{-4}\omega - \frac{1}{2.10^{-7}\omega}\right)^2}}$$

Find the resistance R, inductance L, capacitance C, resonance frequency ω_0, and maximum current amplitude I_{max}.

Problem 4

The current amplitude I(ω) (in Amperes) of a series RLC circuit depending on the driving angular frequency ω (in radian/second) is given as per the following function:

$$I(\omega) = 2 \times 10^{-6} \times \left(30000\omega - 300\omega^2 + \omega^3\right)$$

Find the resonance angular frequency ω_0 and the maximum current amplitude I_{max}.

Adrian Carmichael, Group Meeting 11/09/09

CoMPASS

- Created new protocol for open ended interviews with virtual or physical materials.
- Began simulation interviews on Friday.
- Goals:

1. Gather data on how the physical and virtual environments each support or impede dynamic transfer.
2. Determine what kind of scaffolding from the interviewer supports additional dynamic transfer.
3. Trace the conceptual resources gained as student's progress through activity

NSF Fellowship

- completed fellowship application for eye tracking project. Goal is to show that attentional cueing can increase speed and understanding in solving physics problems with visual component and eventually simulations.

Eye Tracking Project

- on hold. collected more physics problems which meet our criteria for having a spatial component in the image.

Jackie

- Completed Oral Exam (woohoo!)
- Interviews with Simulation or Physical Experiment
  - More open-ended overall challenge
  - Specific sub-challenges
  - Phrased in more “authentic” way
- Inclined Plane Implementation in PW next week!
- Analysis…
- Writing….