

Physics Education Research at K-State

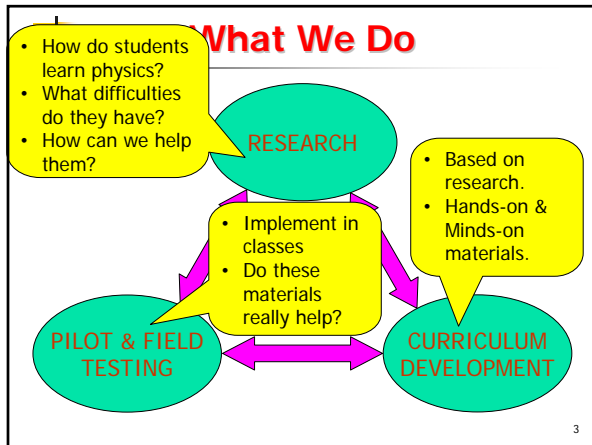
Physics Education Research Group
K-State PHYSICS DEPARTMENT

Website
<http://web.phys.ksu.edu>

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Kansas State **Physics Education Research Group**

- **Post-doc**
 - Dr. Brian Adrian
- **Lab Director**
 - Dr. David Van Domelen
- **Visiting Faculty**
 - Dr. B. N. Meera
- **Staff**
 - Peter Nelson
 - Kim Coy
- **Graduate Students**
 - Bijaya Aryal
 - Spartak Kalita
 - Charles Mamolo
 - Arifa Habib
 - Mojgan Matloob
 - Dyan Jones
 - Fran Mateycik
 - Jackie Haynicz
 - Irakli Svintradze



Ongoing Projects (slide 1 of 6)

- **CAREER Project**
 - How do student understand everyday devices and phenomena?
 - What instructional strategies can we use to facilitate their understanding?
 - Devices/Phenomena Explored
 - Bicycle (*Paula Engelhardt*)
 - Light bulb (*P. Engelhardt & Kara Gray*)
 - Musical Instruments (*Paula Engelhardt*)
 - Everyday Electrical Devices (*Jackie Haynicz*)
 - Physics in Movies (*Carina Poltera*)
 - Microscopic Friction (*Edgar Corpuz*)
 - Optical devices (*Mindy Gratny*)

Ongoing Projects (slide 2 of 6)

- **Modern Miracle Medical Machines**
 - How do students understand the physics underlying modern medical devices and procedures
 - Positron Emission Tomography (*Bijaya Aryal*)
 - X-Rays (*Spartak Kalita*)
 - Human Eye (*Dyan Jones*)
 - Others


Ongoing Projects (slide 3 of 6)

- **Transfer from Math to Physics**
 - How do students transfer what they have learned in Math courses to Physics courses
 - Trigonometry to Physics (*Darryl Ozimek*)
 - Calculus to Physics (*Lili Cui*)

$$\frac{\mu_0 \int_0^R J(r) \cdot (2\pi r dr)}{2\pi R}$$

Ongoing Projects (slide 4 of 6)

- Physics PATHWAY
 - Developing & Evaluating an online video database for physics teachers using Synthetic Interviews -- Collaboration with *Scott Stevens*, Carnegie Mellon Univ.
 - Brian Adrian*
 - Mojgan Matloob*



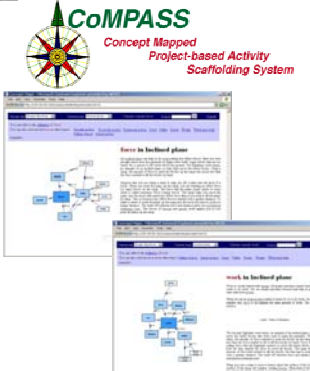
Ongoing Projects (slide 5 of 6)

- PDA's for a Classroom Interaction System
 - Developing Web-based software (*Joe Beuckman*)



Ongoing Projects (slide 6 of 6)

- CoMPASS
 - Using hypertext based Concept Maps to scaffold learning in a Design-based, Hands-on Learning Environment for Middle School students (Grades 6-8)
 - Collaboration with *Sadhana Puntambekar*, Univ. of Wisconsin, Madison



Recently Started Projects

- Physics PATHWAY – Next Generation
 - Research on how students learn using the system – Collaboration with *Scott Stevens*, Carnegie Mellon Univ.
- Case Re-use
 - How students reuse solved examples to solve problems. – Collaboration with *Dave Jonassen*, Univ. of Missouri.
- Inquiry Courses for Elementary Teachers
 - How does students' experience in Concepts of Physics affect their performance in the Elementary Science Methods.
 - Do students who take inquiry-based science teach differently when they become teachers? (*Arifa Habib*) -- Collaboration with *Dennis Sunal*, Univ. of Alabama
- Going WILD (Wandering Interactive Labs & Demos)
 - Using HP Tablet PCs for real-time data collection & sharing (*David Van Domelen* & *Peter Nelson*)

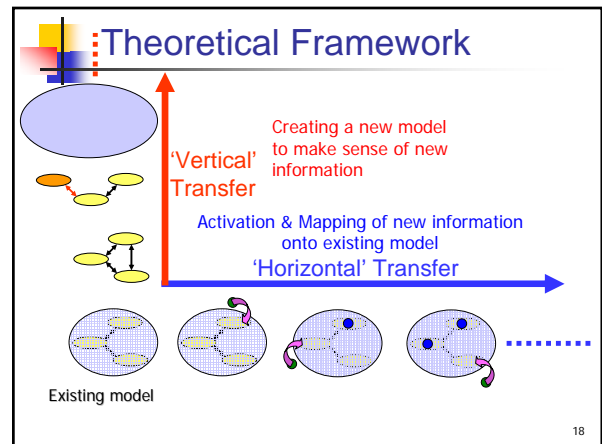
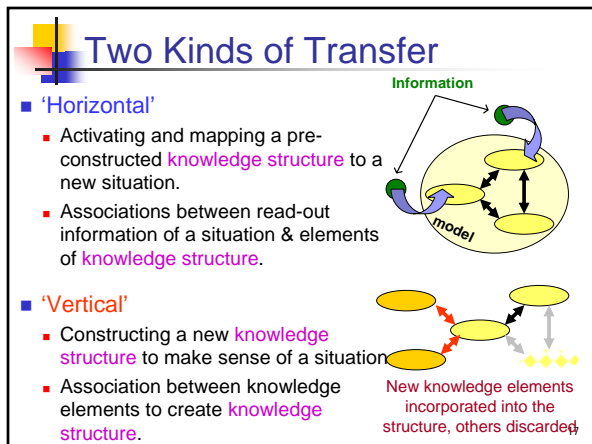
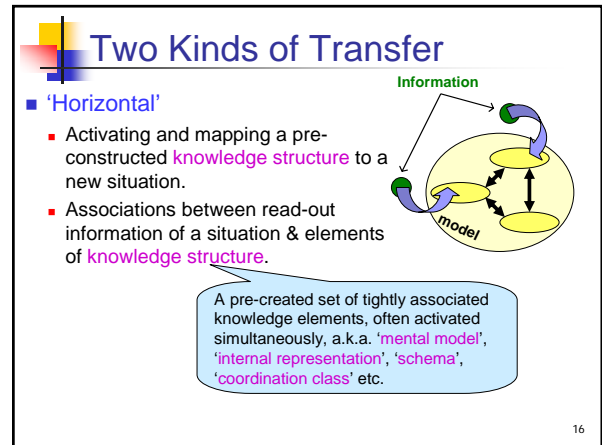
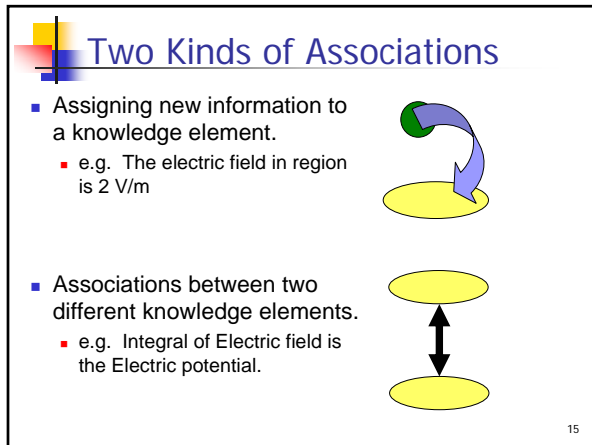
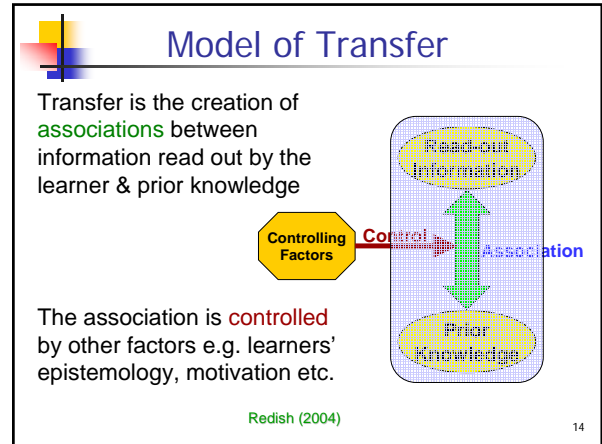
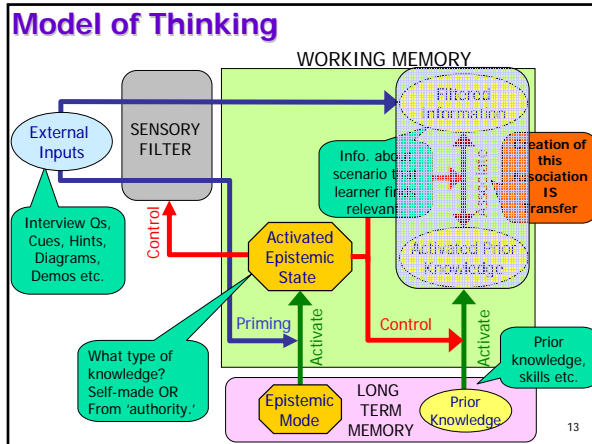
Overarching Themes

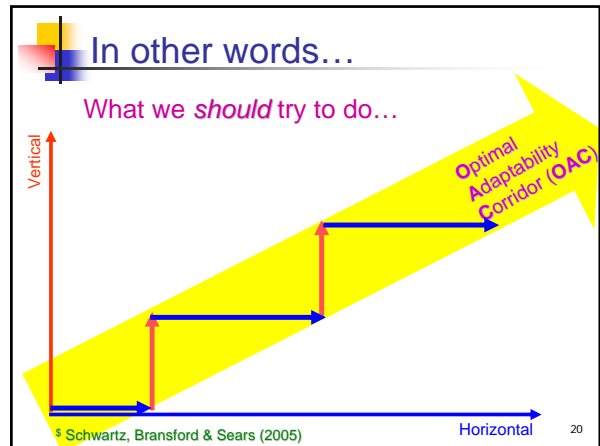
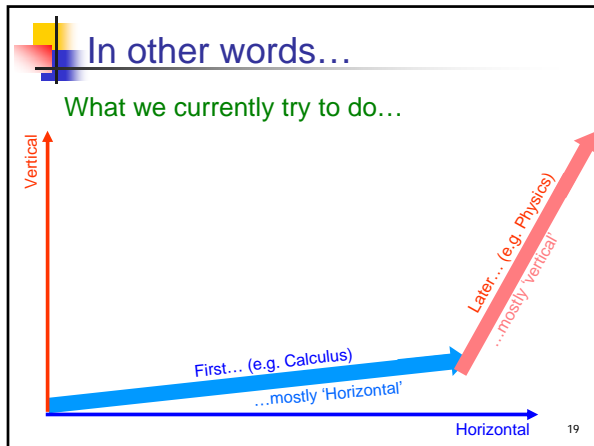
- Transfer of Learning
- Conceptual Development & Change
- Teacher training & preparation

Research Tools

- Clinical Interviews**
Explore ideas that students bring from prior experiences.
- Teaching Interviews**
Investigate how students interact in groups to build their ideas in a mock instructional setting.
- Surveys**
Large scale probes.







Any Questions?

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