

85-738 / 85-438 Educational Goals, Instruction, and Assessment

Core Course 2 for the Program in Interdisciplinary Educational Research (PIER)

Carnegie Mellon University

Draft Syllabus for Fall 2007

Professor: Dr. Sharon M. Carver 412-268-1499 sc0e@andrew.cmu.edu MMC 17D

Schedule: Tuesday / Thursday 4:30 – 5:50 pm Baker Hall 340A

Goals:

Students will learn to use scientifically-based principles and practical strategies for

- 1) developing learner models and educational goals based on detailed task analysis of the knowledge, skills, and dispositions required for understanding and mastery,
- 2) aligning the instructional program and its valid assessment with learners and goals, and
- 3) considering additional aspects of learning environments that may impact implementation and evaluation.

Individual Course Project:

This project involves the choice of a specific unit to teach at a particular age level, followed by progressive development of a learner model, task analysis of the learning goals, and design of assessment and instruction. Explicit rationale for the design will be based on key underlying principles from the course, with specific citations from both course readings and additional project-related references. This design will be supplemented by briefly outlining a research program to test key components, and then culminated by class and public presentations of the project.

Field Trips:

September – CMU Children’s School (www.psy.cmu.edu/childrenschool)

October – Children’s Museum (www.pittsburghkids.org) &

UPCLOSE (www.upclose.lrdc.pitt.edu)

November – Propel Charter School (www.propelschools.org)

OR propose a “Create Your Own Adventure” Field Trip

Assignments:

- Preparatory Assignment re: “What the best college teachers do” (Summer 2007)
- Big Ideas Summary with Key References
- Two Field Trip Reviews

Grading:

Seminar Preparation & Participation 25%

Assignments 25%

Course Project, Rationale & Reflection 30%

Class Presentation 10%

Poster Presentation 10%

Books to purchase for your library or borrow:

Bain, K. (2004.) *What the best college teachers do*. Cambridge, MA: Harvard University Press.

Bransford, J.D., Brown, A.L. & Cocking, R.R. (2000.) *How people learn: Brain, Mind, Experience, and School*. Washington, D.C.: National Academy Press.

National Research Council (2001). *Knowing what students know: The science and design of educational assessment*. National Academy Press: Washington: DC.

Preliminary List of Articles & Chapters that will be available on the course blackboard:

Berger, K.S. (2000). *The Developing Person: Through Childhood and Adolescence* (5th Edition). New York, NY: Worth. (Chapter 12: The School Years – Cognitive Development and Chapter 15: Adolescence – Cognitive Development)

Bielaczyc, K. (2006). Designing social infrastructure: Critical issues in creating learning environments with technology. *Journal of the Learning Sciences*, **15** (3), 301-330.

Carver, S.M. (2001). Cognition and instruction: Enriching the laboratory school experience of children, teachers, parents, and undergraduates. In S.M. Carver & D. Klahr (Eds.) *Cognition and instruction: Twenty-Five years of progress* (pp. 385-426). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Carver, S.M. (1988). Learning and transfer of debugging skills: Applying task analysis to curriculum design and assessment. In R.E. Mayer (Ed.), *Teaching and Learning Computer Programming: Multiple Research Perspectives* (pp. 259-297). Hillsdale, NY: Erlbaum.

Clark, D. & Linn, M.C. (2003). Designing for knowledge integration: The Impact of instructional time. *Journal of the Learning Sciences*, **12** (4), 451-492.

Hausmann, R.G.M. & VanLehn, K. (2007). *Explaining self-explaining: A contrast between content and generation*. AIED – rest of reference??

Hayes, J.R. (1981). *The complete problem solver*. Philadelphia, PA: The Franklin Institute Press. (Chapter 3: Protocol Analysis)

Klahr, D. and Carver, S.M. (1988). Cognitive objectives in a LOGO debugging curriculum: Instruction, learning, and transfer. *Cognitive Psychology*, **20**, 362-404.

Meece, J.L. (2002). *Child & adolescent development for educators* (2nd Edition). New York, NY: McGraw Hill. (Chapter 7: Self-Concept, Identity, and Motivation)

Minstrell, J. (2001). The Role of the Teacher in Making Sense of Classroom Experiences and Effecting Better Learning. In Carver, S.M. and Klahr, D. (Eds.) *Cognition and instruction: Twenty-Five years of progress* (pp. 121-149). Mahwah, NJ: Lawrence Erlbaum Associates.

Rummel, N., & Spada, H. (2005). Learning to collaborate: An instructional approach to promoting collaborative problem-solving in computer-mediated settings. *Journal of the Learning Sciences*, **14**(2), 201-241.

Wiggins, G. & McTighe, J. (2005). *Understanding by Design* (Expanded 2nd Edition). Alexandria, VA: Association for Supervision and Curriculum Development.

Wiley, J. & Voss, J. F. (1999). Constructing arguments from multiple sources: Tasks that promote understanding and not just memory for text. *Journal of Educational Psychology*, **91**, 301-311.

Zohar, A. (2006). The nature and development of teachers' metastrategic knowledge in the context of teaching higher order thinking. *Journal of the Learning Sciences*, **15** (3), 331-378.

WEEK 1: COURSE OVERVIEW

Tuesday, August 28

What the Best College Teachers Do (Bain)

Thursday, August 30

Cognition and instruction: Enriching the laboratory school experience of children, teachers, parents, and undergraduates (Carver, 2001)

Backward Design (Wiggins & McTighe, 2005, Chapter 1)

Guiding Questions:

What did the readings add to our understanding of the course focus (big ideas)?

In what ways do the two readings advocate similar approaches (or not)?

What specific strategies are suggested for identifying goals, planning assessments, and designing instruction?

What is missing from one or both of the approaches?

WEEK 2: SCIENCE of LEARNING

Tuesday, September 4

Learning: From Speculation to Science (HPL, Chapter 1)

Learning to collaborate: An instructional approach to promoting collaborative problem solving in computer-mediated settings (Rummel & Spada, 2005)

Guiding Questions:

What big ideas re: learners, goals, assessment, instruction, and research are advocated by the HPL review chapter?

In what ways would differences in the subject matter impact the design process?

How well does the Rummel & Spada study exemplify the big ideas? Do they add any big ideas of their own?

Thursday, September 6

Advances in the Sciences of Thinking and Learning (KWSK, Exec Summ & Chapter 3)

Explaining Self-Explaining: A Contrast Between Content and Generation (Hausmann & Vanlehn, 2007)

Guiding Questions:

What big ideas re: learners, goals, assessment, instruction, and research are advocated by the KWSK reading?

In what ways would differences in the subject matter impact the design process?

How well does the Hausmann and Vanlehn study exemplify the big ideas? Do they add any big ideas of their own?

• **Project Step 1: Context & Initial Resources**

WEEK 3: LEARNERS

Tuesday, September 11

The School Years / Adolescence: Cognitive Development (Berger, 2000, Chapters 12 & 15)

Guiding Questions:

What factors related to a learner's age and stable individual differences should be considered when setting goals, planning assessments, and designing instruction? How? Specifically how might each matter for your project domain?

Thursday, September 13

How Experts Differ from Novices (HPL, Chapter 2)

Protocol Analysis (Hayes, 1981, Chapter 3)

Guiding Questions:

What factors related to a learner's experience and knowledge base should be considered when setting goals, planning assessments, and designing instruction? How? Specifically how might each matter for your project domain?

WEEK 4: GOALS

Monday, September 17

PIER Ice Cream Social at the Children's School (4:30pm)

BONUS: View posters from prior student projects and talk with students!!

Tuesday, September 18

Learning and Transfer (HPL, Chapter 3)

Locate several examples of state standards that relate to your project topic.

Guiding Questions:

Why are we reading about transfer when we're trying to specify learning goals?
What types / categories of goals should we specify?
How do these types relate to the standards you've gathered?

Thursday, September 20

Cognitive objectives in a LOGO debugging curriculum: Instruction, learning, and transfer (Klahr & Carver, 1988) OR *Learning and transfer of debugging skills: Applying task analysis to curriculum design and assessment* (Carver, 1988)

Seek goal specifications related to your project topic.

Generate ideas for goals related to an Art & Artists Unit in Early Childhood.

Guiding Questions:

What types / categories of goals are specified for debugging? For your project topic?
How well are they integrated into the instruction and assessment plan? What's missing?
Does the research design enable an effective test of whether the goals are met?

• **Project Step 2: Anticipated Learner Profile**

WEEK 5: ASSESSMENT

Children's School Field Trip M 9/24 12:30-3:00

Tuesday, September 25

Rethinking the Foundations of Assessment (KWSK, Chapter 1)

The Nature of Assessment and Reasoning from Evidence (KWSK, Chapter 2)

Guiding Questions:

Distinguish the multiple purposes of assessment and relate each to your project topic.

How does the assessment triangle relate to our G-I-A framework?

What BIG Ideas about assessment emerge from the readings?

Do any of them apply differently depending on the domain or the purpose?

Thursday, September 27

Assessing for Deep Understanding (HLS, Chapter 13, Carver)

Read an article related to your project topic.

Generate assessment ideas related to the Art & Artists goals discussed last week.

Guiding Questions:

Distinguish intervention monitoring from assessment and relate each to your project.

How well has assessment re: your project topic met the criteria of being sound, sensitive, and systematic? Which recording techniques and research designs could you use?

• **Children's School Field Trip Review**

WEEK 6: INSTRUCTION

Tuesday, October 2

The Design of Learning Environments (HPL, Chapter 6)

Constructing arguments from multiple sources: Tasks that promote understanding and not just memory for text (Wiley & Voss, 1999)

Guiding Questions:

Identify the learners, goals, instruction, assessment, and research design related to the Wiley & Voss study. What BIG ideas are evident in their work? Which are tested?

What BIG ideas does HPL advocate for designing learner, knowledge, assessment, and community centered environments? Which are new in our discussion?

Thursday, October 4

Designing for knowledge integration: The Impact of instructional time (Clark & Linn, 2003)

Read an article related to your project topic.

Generate instruction ideas to yield success on the Art & Artists assessments from last week.

Guiding Questions:

Identify the learners, goals, instruction, assessment, and research design related to the Clark & Linn studies. What BIG ideas are evident in their work? Which are new in our discussion? Which are tested?

Do the same for the article you found related to your project topic.

• **Project Step 3: Learning Goal Specification**

WEEK 7: ALIGNMENT

Tuesday, October 9

Implications of the New Foundations for Assessment Design (KWSK, Chapter 5)

Assessment in Practice (KWSK, Chapter 6)

Guiding Questions:

Consider the example educational designs in both chapters. How effective is the alignment between the goals, instruction, and assessment?

What trade-offs were evident in the designs?

What ideas could be applied to your project?

Thursday, October 11

Review of Large-Scale Programs (probably including Teach for America, BUILD, etc.)

Guiding Questions:

In what ways do the sample program designs reflect integration of the BIG Ideas we've discussed?

What principles are not evident or actually violated?

What research questions could productively, and practically, be investigated?

• BIG Ideas Draft

WEEK 8: SOCIAL / MOTIVATION

UPCLOSE / Museum Field Trip??

Tuesday, October 16

Designing social infrastructure: Critical issues in creating learning environments with technology (Bielaczyc, K. (2006). *JLS* 15(3), pp. 301-330.)

Guiding Questions:

Distinguish the dimensions of social infrastructure. What BIG ideas need to be added to your set in order to yield effective designs?

How does each relate to the educational design you are developing?

Thursday, October 18

Self-Concept, Identity, and Motivation (Meece, 2002, Chapter 7)

Guiding Questions:

What BIG ideas about the social aspects of learning emerge from the reading?

How do they relate to the more cognitive principles we've already identified? Are there any conflicts? In what ways might trade-offs have to be made?

• Project Step 4: Assessment Design

Tuesday, October 23

Teacher Learning (HPL, Chapter 8)

The Role of the Teacher in Making Sense of Classroom Experiences and Effecting Better Learning (C&I, Chapter 4, Minstrell)

The nature and development of teachers' metastrategic knowledge in the context of teaching higher order thinking (Zohar, 2006)

Guiding Questions:

How does the G-I-A framework relate to teachers as learners? What BIG ideas that we've already discussed are specifically advocated in the readings? What's new?

In what ways does the ill-defined nature of teaching challenge the BIG ideas?

Thursday, October 25 (Sharon at National Association of Laboratory Schools Conference)

Planning Meeting / Mid Course Evaluation - Based on Student Input, Project Topics, and

Progress in the first 8 weeks of the course, students will meet to generate input regarding the seven open sessions, as well as to collaboratively develop a mid-course evaluation.

Possibilities for Additional Topics Include:

Project Feedback Session(s)

Specific subject areas

Technology

Design Experiments

Ethics / Equity

Individual Differences

Speakers from the Field – Curriculum Design, Teachers, etc.

ETC.

• **UPCLOSE/Museum Field Trip Review**

WEEK 10: EGIA REFLECTION Children's Museum / UPCLOSE Field Trip 10/30/07

Tuesday, October 30

Reflection on Course Evaluation & Planning Summaries

Reflection on Children's Museum / UPCLOSE Field Trip (*background reading*)

Learning in Activity (James G. Greeno, *HLS Ch.6*)

Thursday, November 1

Reflection on Course Projects (Brief Overviews & Key Questions by each student)

Sunday, November 4

• **Project Step 5: Instructional Design**

WEEK 11: EGIA in PRACTICE

PROPEL Charter School Field Trip 11/6/07

Tuesday, November 6

3pm – Attend Anne Fay's Computer Science Colloquium on Assessment FOR Learning

Reflection on the Colloquium

Reflection on Propel Charter School Field Trip (*background reading*)

Thursday, November 8

Seminar led by Anne Fay re: EGIA at the University Level, including course and program design, as well as the impact of Middle States Accreditation processes (*reading, seminar ppt and web site exploration*)

WEEK 12: EGIA in SPECIFIC CASES

Tuesday, November 13 (Second Language Learning)

Implicit and Explicit Corrective Feedback and the Acquisition of L2 Grammar (Ellis, Loewen, and Erlam, *SSLA 2006*)

Note: Consider both application of feedback principles and principles of research design relative to individual projects.

Thursday, November 15 (Assessing The Arts & Other Ill-Defined Domains)

Review the AP Music and Art Exams, as well as other interesting cases, such as the Praxis

Note: We'll also review the draft input form re: presentations of individual projects.

WEEK 13: EGIA BROUGHT TO SCALE

Tuesday, November 20 (Case Studies of System-Wide Reform)

• **Project Step 6: Research Design**

Thursday, November 22 – *No Class – Thanksgiving Holiday*

WEEK 14: COURSE CONCLUSION I

Tuesday, November 27

Summary of BIG Ideas / Project Review & Final Input

- **BIG Ideas Project** (NOTE: Be ready to share your top 5)

Thursday, November 29

Class Presentations – Mike, Jim, Matt

WEEK 15: COURSE CONCLUSION II

Tuesday, December 4

Class Presentations –Nora, Yuliya, April

Thursday, December 6

Class Presentations – Leigh Ann

Next Steps for Research (HPL, Chapter 11)

Implications and Recommendations for Research, Policy, and Practice (KWSK, Ch. 8)

CULMINATING EXPERIENCES:

PIER Poster Session (Public) Tuesday, December 11 from 1:00-4:00pm

• **Final Project Submission** **Friday, December 14, any time**

Course Celebration (Private) Saturday, December 15, 6:30pm at the Carver Home
