

Conversations on Quality: A Symposium on K-12 Online Learning

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Assessing quality: Learner analytics, or human intuition?

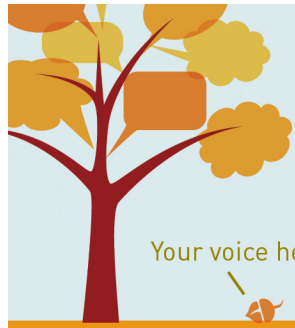
Bror Saxberg
CLO, Kaplan, Inc.



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Presentation at Conversations on quality: a symposium on k-12 online learning, Cambridge, MA.

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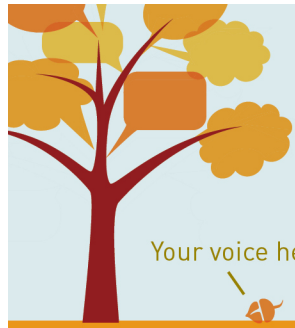
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Topics

- Thought starter questions
- Assessing quality
- Quality solutions for education
- Evidence possibilities

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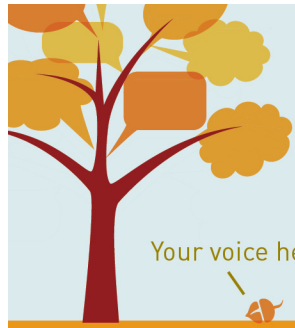
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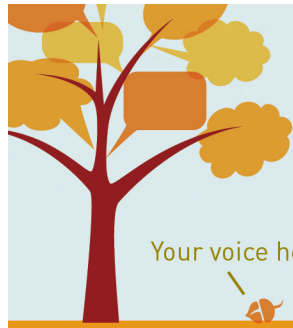
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Assessment of quality

- In education, data is often confused with a problem
- Other fields think about quality and data – medicine:
 - What's empirically known, science, plays a key role
 - Still complex – outcome measures not easily settled
 - Art remains – patient interactions, communications

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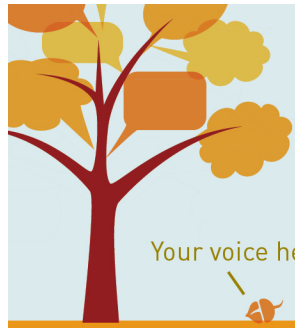


Quality problem solving – other domains

Engineering as model

- Clinicians – engineers of biological science
- Engineers – draw on various sciences
- Learning engineers – draw on learning science
 - Who are our “learning engineers”?

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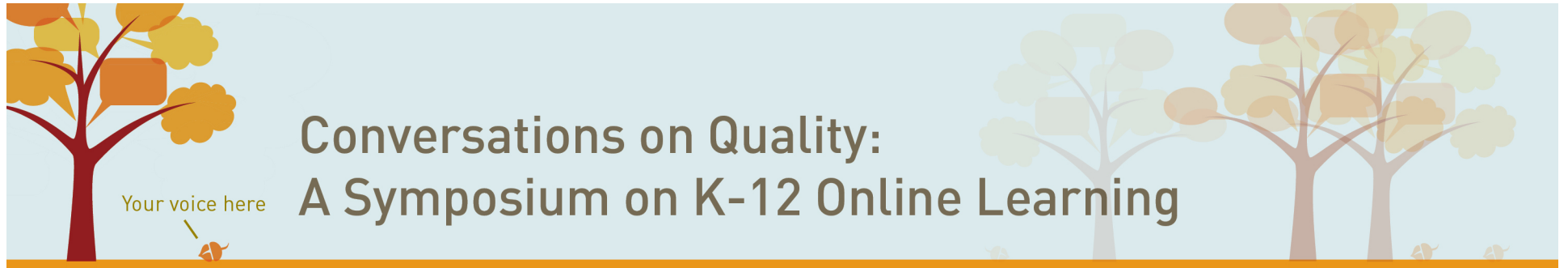
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Quality of an engineering solution?

- Often refines the original problem – provides and uses clarity
- Guided/constrained by empirical science about the natural world
- Fits within constraints – optimizes against some
- Often reuses other quality components
- Easy to use/implement
- Efficiently scalable
- Works as designed
- Fails gracefully

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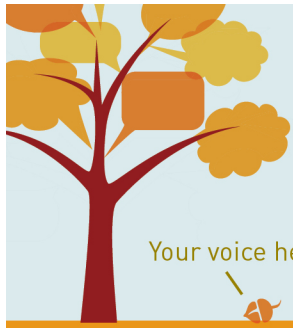
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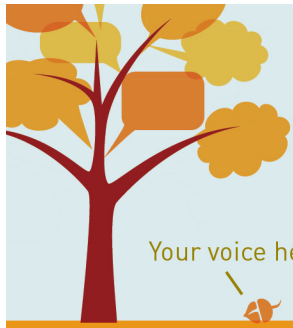
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Refine the problem— what success matters?

- Serious “deliberate practice” during learning
- Specific objective mastery
- Success in the next courses that need “this”
- Retention in systematic learning
- Employment – and employer satisfaction
- Dana Gioia:
“Productive citizen for a free society”

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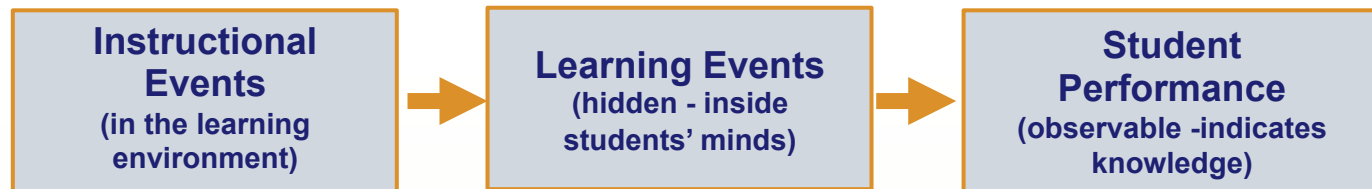


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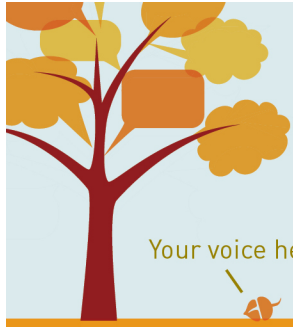


Refine the problem

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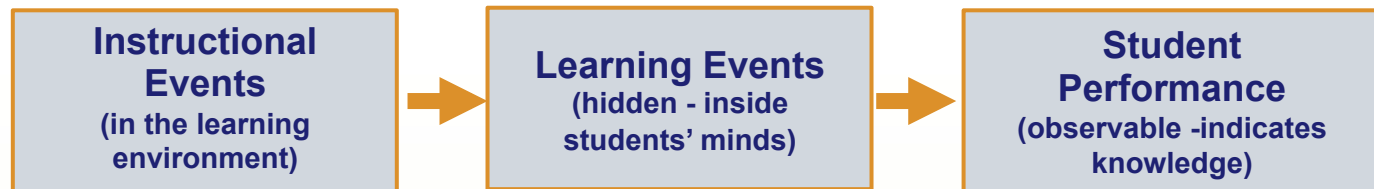


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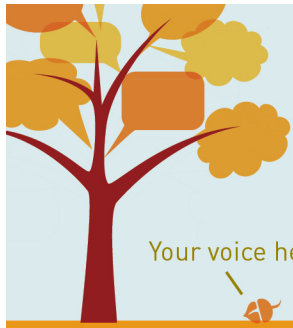
Refine the problem

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Knowledge			
Motivation			
Metacognition			

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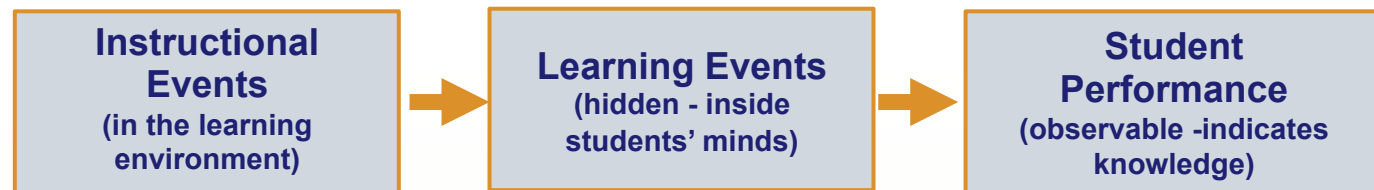


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Refine the problem– add science

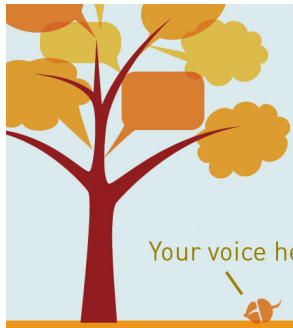
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Knowledge	<ul style="list-style-type: none"> • Explicit: Information, Explanation, Examples, Demos • Implicit: Practice tasks/activities (prompts and response) • Diagnosis and feedback 	<ul style="list-style-type: none"> • Explicit/Declarative/Conceptual/What • Implicit/Procedural/How • Knowledge Components (Procedures + Facts, Concepts, Principles, Processes) 	<ul style="list-style-type: none"> • Response accuracy/errors • Response fluency/speed • Number of trials • Amount of assistance (hints) • Reasoning
Motivation	<ul style="list-style-type: none"> • Orientation/Inoculation • Monitoring • Diagnosis and treatment: Persuasion, Modeling, Dissonance 	<ul style="list-style-type: none"> • Value beliefs • Self-efficacy beliefs • Attribution beliefs • Mood/Emotion 	<ul style="list-style-type: none"> • Behavior related to <ul style="list-style-type: none"> • Starting • Persisting • Mental Effort • Self-reported beliefs
Metacognition	<ul style="list-style-type: none"> • Structure • Guidance 	<ul style="list-style-type: none"> • Planning, Monitoring • Selecting, Connecting 	<ul style="list-style-type: none"> • Amount of guidance required/ requested

See: Koedinger, K.R., Corbett, A.T., and Perfetti, C. (2010). *The Knowledge-Learning-Instruction (KLI) Framework: Toward Bridging the Science-Practice Chasm to Enhance Robust Student Learning*

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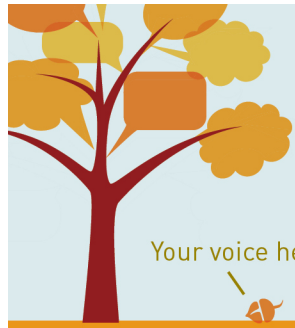
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Clarify (and use) actual constraints

- Topic constraints – what comes before what?
- Physical environment – multiple locations?
- Time available – multiple blocks?
- Media available – multiple types/devices?
- Learner skills to draw on
- People resources to draw on – multiple?
- Costs – capital vs. variable tradeoff?
- Real world: What happens when you TRY it?

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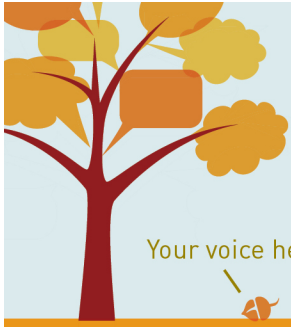
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Checklists

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Our “Kaplan Way” checklist

Categories on the checklist

Kaplan Curriculum Evaluation Checklist February 17, 2011

Course ID: _____ Reviewer: _____

Course ID - Not Edited - > Edited - (check, necessary edit, last name changed will include both name)

Criteria	Score	Comments
1. Learning Outcomes/Objectives		
1.1 Learning objectives are to satisfaction requirements or competencies or common outcomes standards from professional accreditation bodies	0.0	
1.2 Learning objectives are specific and measurable (e.g. student will be able to do...)	0.0	
1.3 Learning objectives are performance-related (e.g. student will be able to do...)	0.0	
1.4 Learn, master, units, course and program objectives aligned. There is a hierarchy of objectives	0.0	
SECTION SCORE	0.0	
2. Assessment		
2.1 Assessment data and rubrics meet learning outcomes objectives	0.0	
2.2 Assessment data measure mastery, reduction of critical concepts, process, facts, concepts, analysis, synthesis, problem-solving, application, evaluation, creation, etc.	0.0	
2.3 Rubric design and performance of assessment items in sequential manner	0.0	
SECTION SCORE	0.0	
3. Practice		
3.1 Practice meets competencies, assessment and outcomes objectives	0.0	
3.2 Practice is not performance to develop procedural knowledge or student knowledge components (facts, concepts, analysis, synthesis)	0.0	
3.3 Practice includes progress and assessment and practice to student knowledge components	0.0	
3.4 Practice includes progress and assessment and practice to student knowledge components	0.0	
3.5 Practice includes progress and assessment and practice to student knowledge components	0.0	
3.6 Practice includes progress and assessment and practice to student knowledge components	0.0	
SECTION SCORE	0.0	
4. Presentation: Examples		
4.1 Examples are relevant, varied and meet practice assessment and outcomes objectives	0.0	
4.2 Examples are varied and meet practice assessment and outcomes objectives	0.0	
4.3 Examples are varied and meet practice assessment and outcomes objectives	0.0	
SECTION SCORE	0.0	
5. Presentation: Information		
5.1 Content and presentation are relevant and varied to perform a skill, task and to meet knowledge components, facts, concepts, analysis, synthesis, application, evaluation, creation, etc.	0.0	
5.2 Information is relevant and varied to perform a skill, task and to meet knowledge components, facts, concepts, analysis, synthesis, application, evaluation, creation, etc.	0.0	
5.3 Information is relevant and varied to perform a skill, task and to meet knowledge components, facts, concepts, analysis, synthesis, application, evaluation, creation, etc.	0.0	
SECTION SCORE	0.0	
6. Content Chunking and Sequencing		
6.1 Content is broken into manageable chunks	0.0	
6.2 Content is broken into manageable chunks	0.0	
6.3 Content is broken into manageable chunks	0.0	
6.4 Content is broken into manageable chunks	0.0	
6.5 Content is broken into manageable chunks	0.0	
6.6 Content is broken into manageable chunks	0.0	
6.7 Content is broken into manageable chunks	0.0	
6.8 Content is broken into manageable chunks	0.0	
6.9 Content is broken into manageable chunks	0.0	
6.10 Content is broken into manageable chunks	0.0	
SECTION SCORE	0.0	

Cheri Gates Project, 17802011.xls Page 1 of 1

TOTAL Instructional Design Score: 0.0

Overall Impression Score (1-5) + Pract (1-5) + Fac (1-5) + Resp (1-5) =

General Comments

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Is the course/lesson designed for effective knowledge acquisition and transfer?

- Learning outcomes/objectives
- Assessments
- Practice
- Presentation: Examples
- Presentation: Information
- Content chunking and sequencing

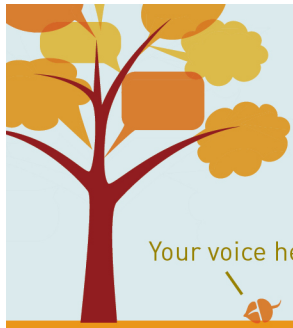
Does the course provide support for motivation?

Does the course provide opportunities for knowledge integration?

Are media used appropriately and efficiently?

Does instruction adapt to student's level of knowledge and motivation?

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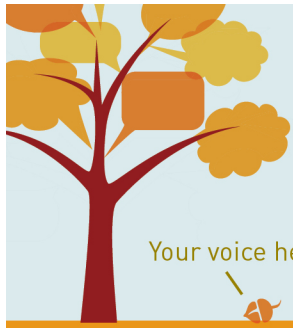
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Monitor actual vs. designed delivery

- Usability testing
- Systematic behavioral observation
- Video/audio with behavioral coding
- Engagement data – timeliness, effort, pattern of use
- [Highly structured learner surveys]
- ~~Learner “liking” surveys~~
- ~~High level, more general observation rubrics~~
- ~~Teacher surveys~~
- ~~Teacher journals~~
- ~~Teacher self-reports~~

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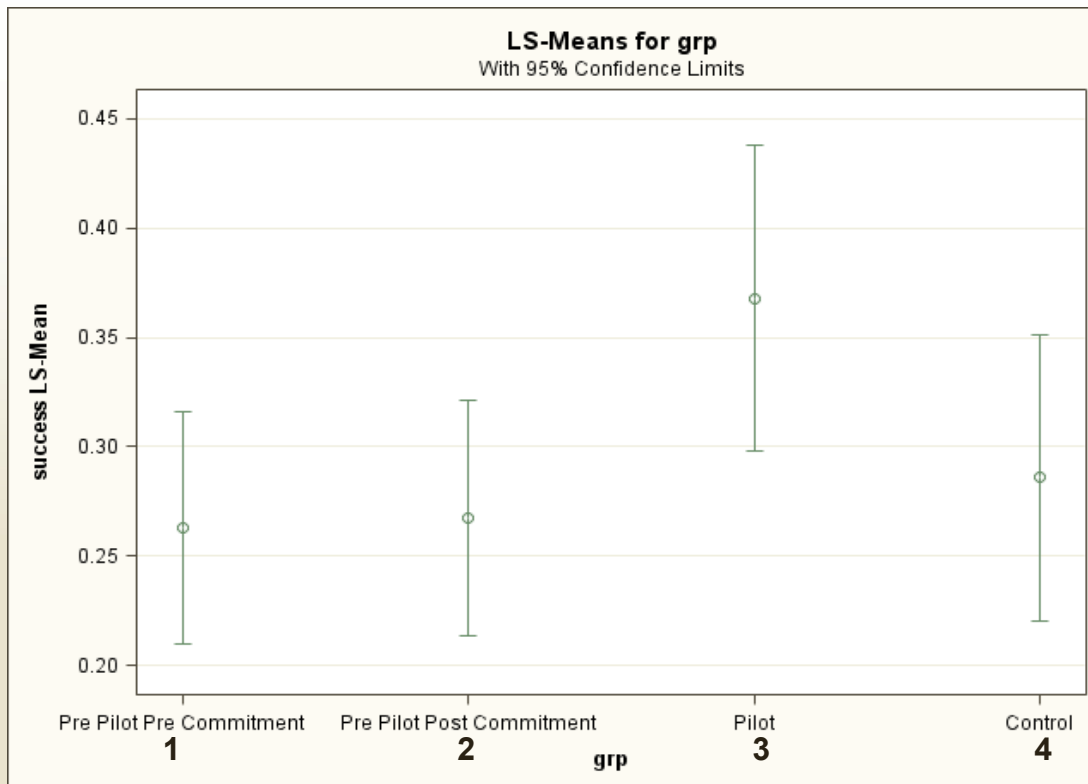


Learning evidence

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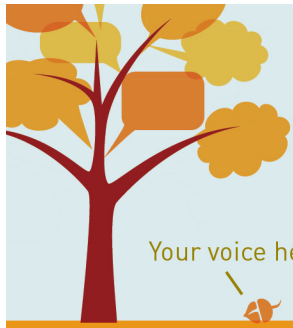
“Success” = CLA Average ≥ 4 AND passed course AND retained to next term
Controlling for differences in course, students, instructors and seasonality



Statistical Significance

Least Squares Means for effect grp				
Pr > t for H0: LSMean(i)=LSMean(j)				
Dependent Variable: success				
i/j	1	2	3	4
1		0.8912	<.0001	0.6515
2	0.8912		0.0002	0.8104
3	<.0001	0.0002		0.0256
4	0.6515	0.8104	0.0256	

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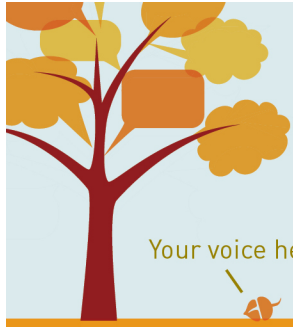
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Longer term success evaluation

- Future course pass rates
- Retention improvement
- Employment – and employer satisfaction
- “Productive citizen of a free society”
 - Voting?
 - Justice system?
 - Civic engagement?

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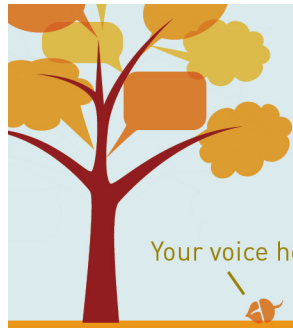
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Quality of entire learning process:
**Is the *process* leading to faster achievement
of goals that matter to learners' success?**

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Appendix: Initial learning engineering readings

- **Why Students Don't Like School**, Daniel Willingham – *highly readable! ;-)*
- **Talent is Overrated**, Geoffrey Colvin – *highly readable! ;-)*
- **E-Learning and the Science of Instruction**, Clark and Mayer, 2nd ed.
- “First Principles of Learning,” Merrill, D., in Reigeluth, C. M. & Carr, A. (Eds.), **Instructional Design Theories and Models III**, 2009.
- **How People Learn**, John Bransford et al, eds.
- “The Implications of Research on Expertise for Curriculum and Pedagogy”, David Feldon, *Education Psychology Review* (2007) 19:91–110
- “Cognitive Task Analysis,” Clark, R.E., Feldon, D., van Merriënboer, J., Yates, K., and Early, S.. in Spector, J.M., Merrill, M.D., van Merriënboer, J. J. G., & Driscoll, M. P. (Eds.), **Handbook of research on educational communications and technology** (3rd ed., 2007) Lawrence Erlbaum Associates

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