

Student Success and the High School–University Transition

Zits, by Jerry Scott and Jim Borgman, November 6th 2010
<http://www.arcamax.com/zits/>

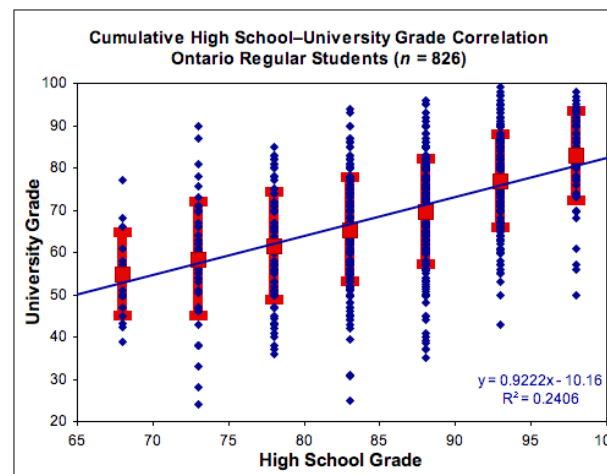
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Thursday, July 7, 2011

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The first-year experience:



- 1st year chemistry
- 2006-2010 surveys
- WD & DNW omitted
- HS mean = 86 ± 7
- Uni mean = 69 ± 14
- Mean Uni vs. HS $R^2 = 0.9752$

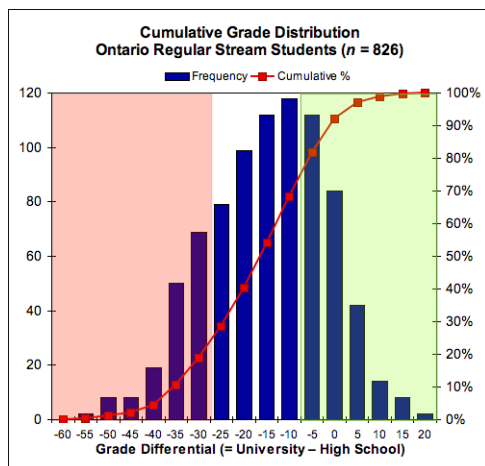
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The first-year experience:



Aggregate student data for 2006–2010 (WD and DNW omitted)

- **Overall:**
 - $GD = -17 \pm 13$
- **Upper quartile:**
 - $GD = -9$ to $+20$
- **Lower quartile:**
 - $GD = -60$ to -30

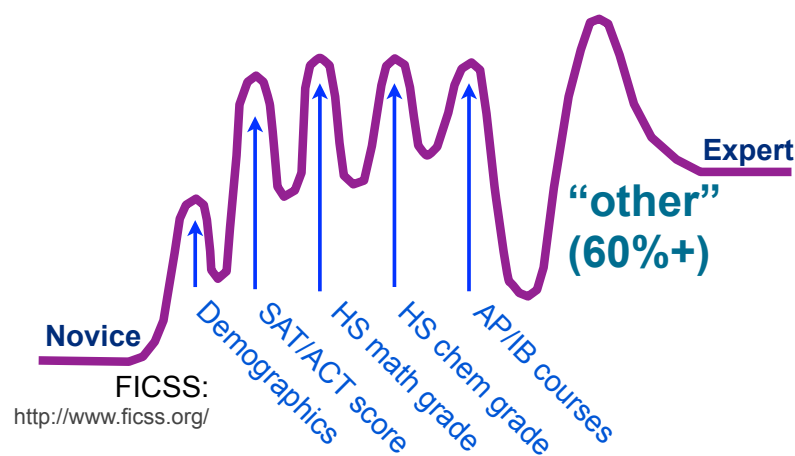
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Pathways & barriers to success:



FICSS:
<http://www.ficss.org/>

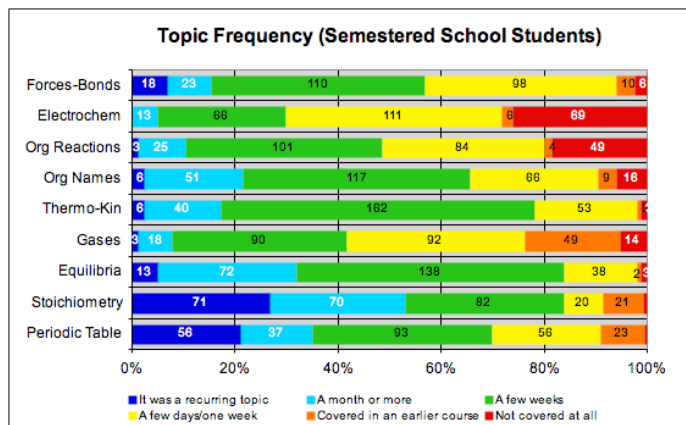
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Topical Content: Semestered

Student recall of coverage, Ontario 11/12U Chem.



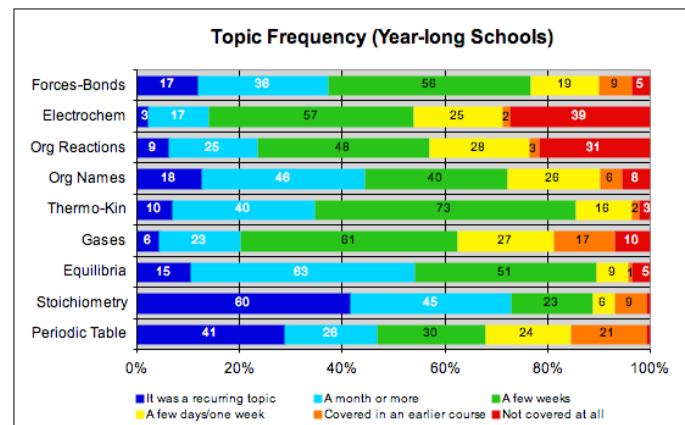
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Topical Content: Year-long

Student recall of coverage, Ontario 11/12U Chem.

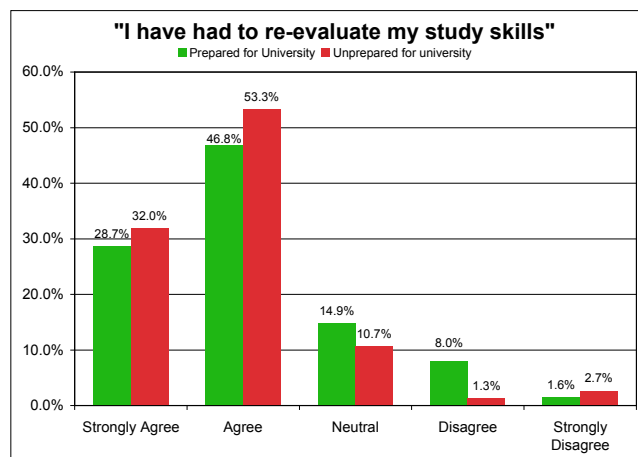


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Student study skills:

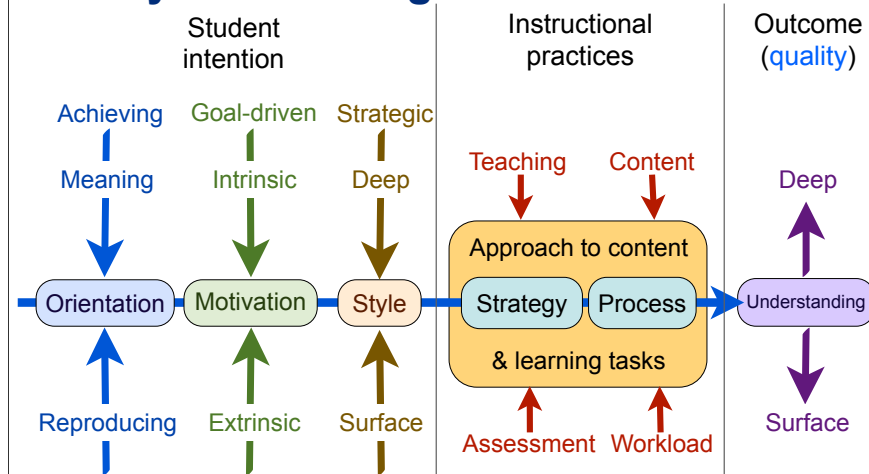


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Ways of learning:



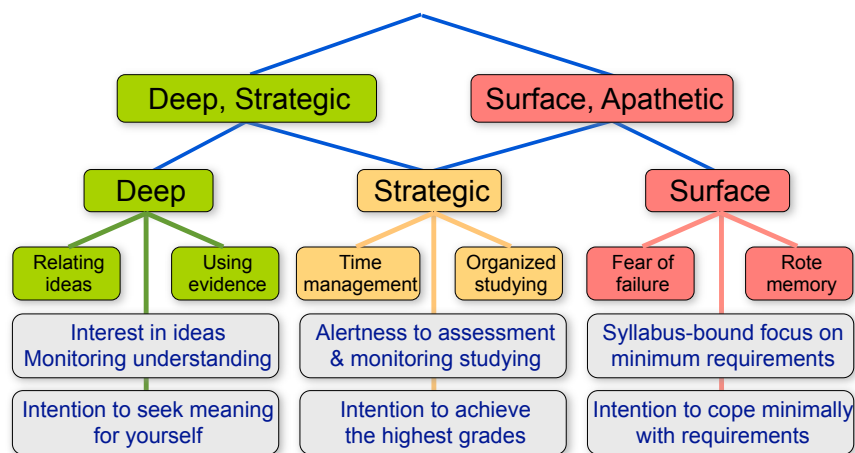
<http://www.chem.utoronto.ca/~dstone/Research/bibliography.html>

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ASSIST Inventory (Entwistle et al):



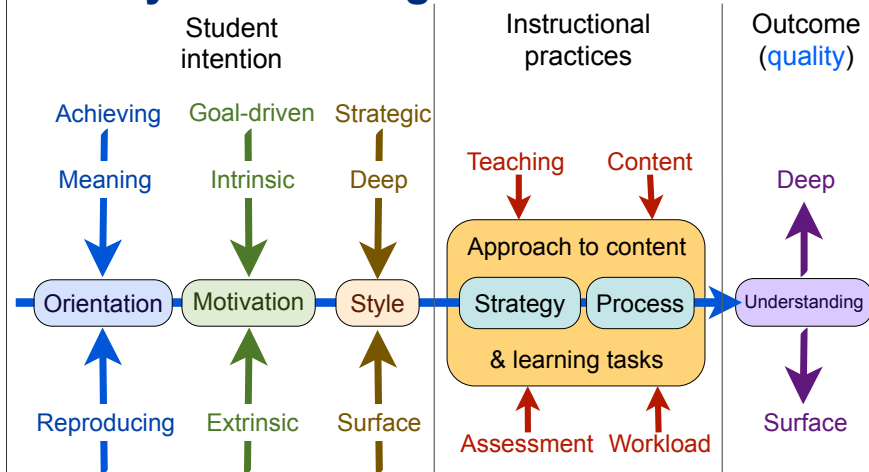
<http://www.etl.tla.ed.ac.uk/questionnaires/ASSIST.pdf>

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Ways of learning redux:



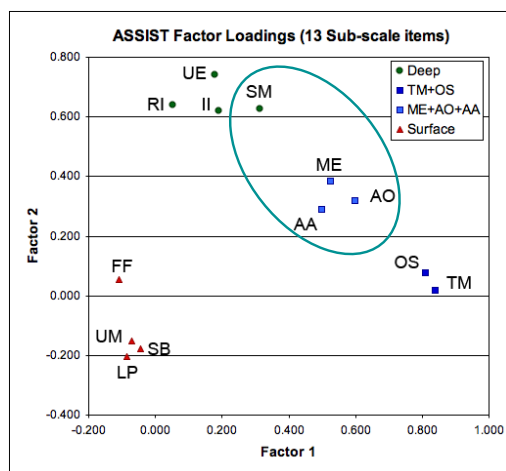
<http://www.chem.utoronto.ca/~dstone/Research/bibliography.html>

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ASSIST Local validation:



Cronbach α :

- 403 responses
- 52 items
- 13 sub-scales
- ▶ 0.63 – 0.81
- 3 main scales
- ▶ 0.87 – 0.93

Factor analysis:

- 403 responses
- 13 sub-scales
- 3 factor solution
- 50.5% of variance
- $\chi^2 = 154$ ($p < 10^{-4}$)

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ASSIST Main scale correlations

• Pearson's r values:

- 1st-year chemistry students (life sciences), $n = 394$

Scale:	Deep	Strategic	Surface
1 st -year	0.1960	0.2859	-0.4060
Deep		0.4561	-0.3545
Strategic			-0.2528

All r values statistically significant @ 99.99% CL ($p < 10^{-4}$)

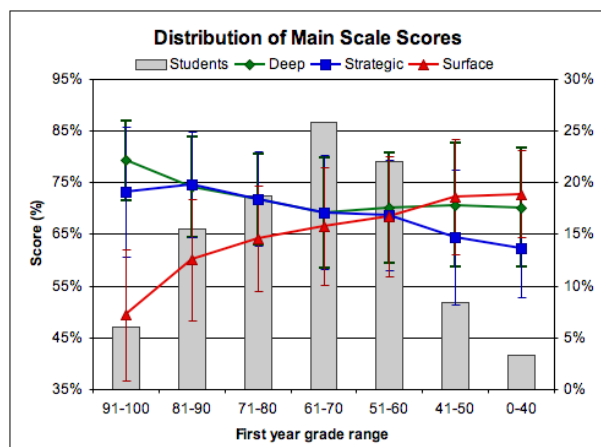
$$t = \frac{|r|\sqrt{n-2}}{\sqrt{1-r^2}}; H_0(r=0)$$

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ASSIST Scores and grades



Mean normalised scores by grade range for 1st-year chemistry students (life sciences) $n = 394$; error bars are ± 1 s.d.

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Knowledge in the Google age?

Doonesbury, by Garry Trudeau, June 25th 2011
<http://www.arcamax.com/thefunnies/doonesbury/>

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Student perceptions - school:

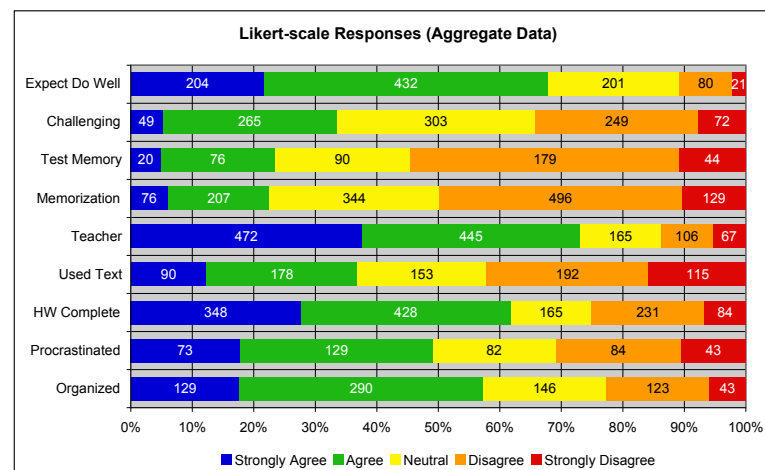
- I expect to do well in university chemistry
- I found high school chemistry challenging
- Tests emphasized memorization
- Classes emphasized memorization
- My teacher performed effectively
- I used the text extensively
- I always completed homework
- I procrastinated a lot
- I was organized and used my time effectively

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Student perceptions - school:

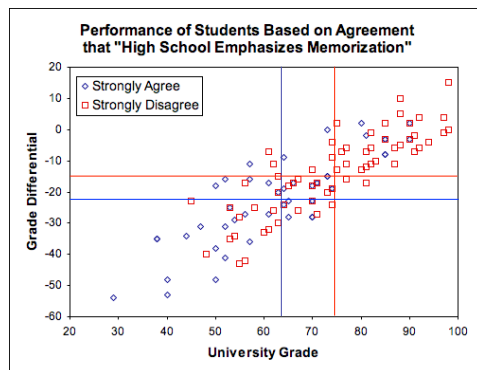


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High school memorization:



Statistical tests:

- Same mean high school grades ($p > 0.01$)
- Different mean university grades ($p < 0.0001$)
- Different mean GDs ($p < 0.001$)

- Students who felt that high school emphasized memorisation tend to do worse in university

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High school habits:

Comparison of results for extreme response groups
(*t*-test of means, unequal variance)

Category	Mean HS Grade	Mean Uni Grade	Mean GD
Time Management	Different $p < 0.005$	Same $p \gg 0.01$	Same (?) $0.01 < p < 0.05$
Homework Completion	Different $p < 0.005$	Same $p \gg 0.01$	Same $p \gg 0.01$
Used Text	~Different $p = 0.0099$	Same $p \gg 0.01$	Same $p > 0.05$

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ASSIST Deep scale:

- Interest in ideas (II)

"I sometimes get 'booked' on academic topics and feel I would like to keep on studying them"

- Relating ideas (RI)

"I like to relate ideas I come across to those in other topics or courses"

- Seeking meaning (SM)

"When I'm reading an article or book, I try to find out for myself exactly what the author means"

- Use of evidence (UE)

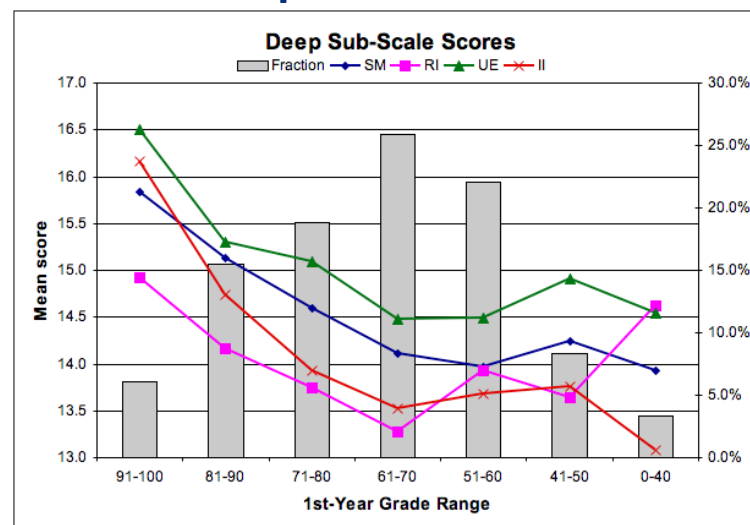
"It's important for me to be able to follow the argument, or to see the reason behind things"

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ASSIST Deep scale:



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ASSIST Strategic scale

- Achieving orientation (AO)

"I put a lot of effort into studying because I'm determined to do well"

- Alertness to assessment demands (AA)

"I keep an eye open for what lecturers seem to think is important..."

- Monitoring effectiveness (ME)

"I think about what I want to get out of this course to keep my studying focussed"

- Organised studying (OS)

"I usually plan out my week's work in advance, either on paper or in my head"

- Time management (TM)

"I'm pretty good at getting down to work whenever I need to"

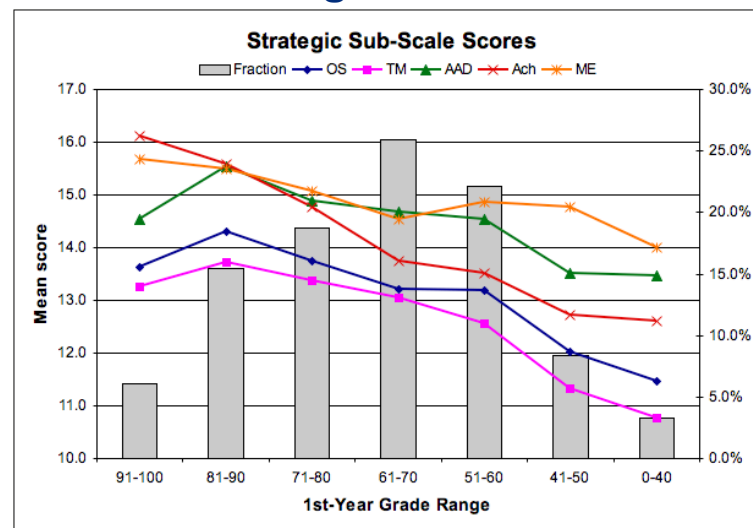
"I work steadily through the semester, rather than leave it all until the last minute"

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ASSIST Strategic scale



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ASSIST Surface scale

- Fear of failure (FF)

"I often worry about whether I'll ever be able to cope with the work properly"

- Lack of purpose (LP)

"Often I find myself wondering whether the work I am doing here is really worthwhile"

"I'm not really interested in this course, but I have to take it for other reasons"

- Syllabus boundness (SB)

"I concentrate my learning just on those bits of information I have to know to pass"

- Unrelated memorising (UM)

"Much of what I'm studying makes little sense; it's like unrelated bits and pieces"

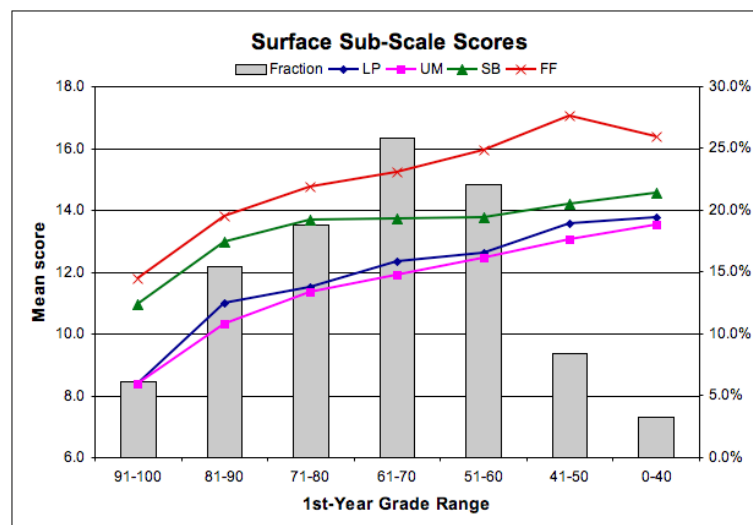
"I'm not really sure what's important in lectures, so I try to get it all down"

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ASSIST Surface scale



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ASSIST Cluster analysis

- k-means grouping into 24 clusters:
 - students with similar “traits”

SM	RI	UE	II	OS	TM	AA	AO	ME	LP	UM	SB	FF	Uni
12.4	10.8	14.0	9.7	10.1	7.1	14.7	11.6	13.2	13.8	13.9	15.2	18.0	57%
15.0	14.9	15.2	17.5	14.4	16.0	17.0	16.3	16.6	9.2	11.3	14.4	17.2	71%
14.0	14.3	15.4	13.0	14.6	14.9	14.6	14.0	14.4	11.9	14.7	15.3	17.6	74%



“Dissonance in study orchestrations” (Jan Meyer *et al*)

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Research teams:

- 2006-7:
 - Robin Baj, Michael Lebenbaum, Sujan Saundarakumaran, Derrick Tam, & Jakub Vodsedalek
- 2007-8:
 - Mena Gewarges, Cindy Hu, Gordon Ng, Jana Pfefferle, and Curtis Wang
- 2008-9:
 - Marlena Colasanto, Lauren Cosolo, Darrin Gao, Inna Genkin, Kelly Hoang, Justina Lee, Bryan Nguyen, and Emily Plobner
- 2010-11:
 - **Shirin Dason**, Xi Nuo Gao, James Hong, Jing Lu, He Zhen Ren, and Heba Shamsi

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