Use of Online, Web-based Data Tools for Improving MSP Evaluations

Describing, Analyzing, & Reporting Curriculum Data

The SEC Toolbox

John L. Smithson, Ph.D.
University of Wisconsin-Madison
The Surveys of Enacted Curriculum (SEC) provide teachers and others a comprehensive set of indicators to facilitate teacher reflection, curriculum planning and program evaluation.

Surveys are offered in both paper- and web-based formats. Results from either format can be posted on-line and/or provided as raw data files for in-depth analyses.
Survey Sections

- School & Class Description
- Use of Homework
- Instructional Activities
  - General
    - Problem Solving Activities
    - Pairs & Small Group Work
    - Use of Hands-on Materials
    - Use of Calculators/Computers & other Ed. Tech.
- Assessment Use
- Instructional Influences
- Instructional Readiness
- Teacher Opinions
- Professional Development
  - Types
  - Content Focus
  - Active Learning
  - Collegial Participation
  - Coherence
  - Time Span
- Teacher Characteristics
- Instructional Content
The SEC Data - Sets

Distinctions

**On-Line**
- Descriptive Data
- Limited Reporting Options
- Easy Access / Indiv. Results

**Off-line**
- Analytic results
- Unlimited reporting
- Requires data manipulation
Conducting Inquiry Using SEC Data

Forms of Inquiry

<table>
<thead>
<tr>
<th>Collaborative</th>
<th>or</th>
<th>Evaluative</th>
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</thead>
<tbody>
<tr>
<td>Teacher Enrichment</td>
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<td>Program Evaluation</td>
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<tr>
<td>School Improvement</td>
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<td>Indicator Reporting</td>
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<tr>
<td>Professional Lrng. Comm.</td>
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<td>Program Management</td>
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</table>
Online Survey Administration

• Approximately 60-90 minutes to complete
• May be completed in multiple sittings
• Data is saved as each section is completed
Welcome to SEC On-Line

The Surveys of Enacted Curriculum website.

Click here or on the "Registrar" Button above to begin.

This is a test site for the SEC Collaborative Project of the State Collaborative on Assessments and Student Standards (SCASS), sponsored by the Council of Chief State School Officers (CCSSO), and under development at the Wisconsin Center for Education Research (WCER) at the University of Wisconsin - Madison.

The purpose of this site is to encourage teacher reflection and participation in conversations about classroom practice and instructional content. Using a survey data collection and reporting model, teachers are able to compare their own reports of practice and instructional content with response by other teachers from around the country as well as within their own school or district. Participating states, schools and districts are also able to make use of aggregated teacher reports (individual teacher responses are not released to any party other than the teacher) to develop a base-line of information about teacher practice in mathematics and science, or to inform professional development or school improvement planning efforts. The site is currently under development. Not all areas are functional at this time.

WCER - meegroup@education.wisc.edu

(www.seconline.org)
Total Number of Registrants: 110

<table>
<thead>
<tr>
<th>Survey Names</th>
<th>Math</th>
<th>Science</th>
<th>ELA</th>
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<th>ELA</th>
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<td>Instructional Content</td>
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Administrative Functions:
Administration Set-up
Review Registrants, Completion Rates
Administrator Report Generator

Back to Top
### Administrator Report Generator

**Select Subject:** Mathematics  
**Select Chart Type:** Instructional Activities

#### Left Chart
- Sample Selection: Group Data  
- District Selection: Madison  
- School Selection: Cherokee Heights  
- Reported By: Grade Level

#### Right Chart
- Sample Selection: Your State  
- District Selection: Milwaukee  
- School Selection: Muir Middle  
- Reported By: Grade Level

[Submit]
Sample Selection: WI - SEC Madison

Report By: Achiev Lvl

Legend

Group: Achiev Lvl
- Mixed Levels (77)
- High (34)
- Average (5)
- Low (32)

State: ProfDev
- All Levels (110)
- High (20)
- Med (16)
- Low (68)

How much of the total mathematics instructional time do students in the target class:

Watch the teacher demonstrate how to do a procedure or solve a problem.

Read about mathematics in books, magazines, or articles (not textbooks).

Take notes from lectures or the textbook.

Complete computational exercises or procedures from a textbook or a worksheet.

Present or demonstrate solutions to a math problem to the whole class.
How much of the English language arts instructional time in the target class do students use to engage in the following tasks?

- **Work with teacher in guided reading or writing practice**
- **Participate in a student-teacher conference**
- **Listen to outside speakers in class**
- **Read aloud (e.g., pair sharing)**
- **View slides, overheads, films, videos, DVDs or listen to recordings**

### State - Class Size
- All Levels: 44
- High: 21
- Med: 14
- Low: 8

### State - % Female
- All Levels: 44%
- High: 1%
- Med: 38%
- Low: 4%
Use a multi-dimensional language for describing instructional content

Topics by Cognitive Demand

(Expectations for Student Learning)
# Categories of Cognitive Demand

<table>
<thead>
<tr>
<th>Topics</th>
<th>Memorize</th>
<th>Perform Procedures</th>
<th>Demonstrate Understanding</th>
<th>Conjecture Generalize Prove</th>
<th>Solve Non-routine Problems</th>
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<td>Multiple Step Equations</td>
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<tr>
<td>Inequalities</td>
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<td>Literal Equations</td>
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<td>Lines / Slope and Intercept</td>
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<td>Operations on Polynomials</td>
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<tr>
<td>Quadratic Equations</td>
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</table>
Analyzing Curriculum Content

The intended curriculum: State content standards—What students should learn

A neutral content grid with cognitive demand

The assessed curriculum: State (and other) assessments—tested learning

The enacted curriculum: What teachers teach

The learned curriculum: Student outcomes based on school learning
Mathematics Content

Percentage of Overall Mathematics Instructional Time

- Not Covered
- <= 2.5%
- <= 5.0%
- <= 7.5%
- >= 7.5%

Group: WI - SEC Madison
District: Madison
School: Cherokee Heights
Count: 5

Data: Madison Data
Cut: Integrated Math

Wisconsin SEC Initiative

Alignment Re-centered: 0.8269

- Not Covered

Group: WI - SEC Milwaukee
District: Milwaukee
School: Muir Middle
Count: 6

Data: Milwaukee Data
Cut: Grade 8

Update Charts

- Number Sense / Properties / Relationships
- Operations
- Measurement
- Algebraic Concepts
- Geometric Concepts
- Data Analysis / Probability / Statistics
- Instructional Technology

Student Expectations

I. Memorize
II. Perform Procedures
III. Demonstrate Understanding
IV. Conjecture, Prove
V. Solve novel, non-routine problems
### Mathematics Content

**Number Sense /**

**Properties /**

**Relationships**

#### Percentage of Overall Mathematics Instructional Time

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<thead>
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<th>District</th>
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**Alignment Re-centered: 0.3243**

**WISCONSIN SEC INITIATIVE**

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| Ratio, proportion |                      |                      |
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| Odds, evens, primes, composites  |                      |                      |
|                                  |                       |                      |

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<thead>
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<th>Estimation</th>
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| Order of operations             |                      |                      |
|                                 |                       |                      |

| Relationships between operations |                      |                      |
|                                  |                       |                      |

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<thead>
<tr>
<th>Mathematical properties (e.g., distributive property)</th>
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#### Student Expectations

I. **Memorize**

II. **Perform Procedures**

III. **Demonstrate Understanding**

IV. **Conjecture, Prove**

V. **Solve novel, non-routine problems**
Content Maps

Number Sense
Operations
Measurement
Algebraic Concepts
Geometric Concepts
Data Analysis
Instructional Technology
State U Grade 8 Mathematics Standards
Algebraic Concepts

- (non-specific)
- Absolute value
- Use of variables
- Evaluate expressions
- One-step equations
- Coordinate Plane
- Patterns
- Multi-step equations
- Inequalities
- Linear/non-linear rel.
- Rate of change/slope
- Oper. on polynomials
- Factoring
- Square roots & radicals
- Operations on radicals
- Rational expressions
- Functions and relations
- Quadratic equations
- Systems of equations
- Systems of inequalities
- Matrices, determinants
- Complex numbers
- other…

State U Grade 8 Mathematics Assessment
Algebraic Concepts

- (non-specific)
- Absolute value
- Use of variables
- Evaluate expressions
- One-step equations
- Coordinate Plane
- Patterns
- Multi-step equations
- Inequalities
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- Factoring
- Square roots & radicals
- Operations on radicals
- Rational expressions
- Functions and relations
- Quadratic equations
- Systems of equations
- Systems of inequalities
- Matrices, determinants
- Complex numbers
- other…
SEC Summary Measures

- Content Marginals
- PD Characteristics
- Standards & Collegiality
- Teacher Characteristics
- Instructional Practices
- Alignment Indices
Content Marginals

Topic Coverage

Math — MX1-MX7 / HMX1- HMX16
Science — SX1 - SX25 / HSX1-HSX25
ELAR — EX1 - EX14

Sum of A / Nbr. Topics / Depth

Cognitive Demand (Math/Science/ELAR)

cgdB Memorize/Memorize//Recall

cgdC Procedures/Investigate/Explain

cgdD Demonstrate/Communicate/Analyze

cgdE Conjecture/Analyze/Evaluate

cgdF Non-routine/Apply/Create
Alignment Relationships in Standards-based Reform

Curriculum

Assessments

Alignment

Standards
Alignment Relationships in Standards-based Reform

Intersection of what is taught with what is tested.

Instruction

Assessment

Standards

Taught, tested, and in the standards

Intersection of what is taught with what is in the standards

Intersection of what is taught with what is in standards.
A Quantitative Approach to Alignment

SEC Alignment Process

Content analyses of curriculum documents and reports of practice by content experts using two-dimensional content language.

Multiple raters (w/ content & assessment expertise) using independent ratings in combination with team discussions.

Content Description [Topic(s) by Cognitive Demand(s)]

Yields Alignment Index based on:

\[ I = 1 - \frac{\sum |x - y|}{2} \]
Calculating Alignment

\[ 1 - \frac{\sum |x-y|}{\sum |x-y| (1-n)}/2 \]

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<tr>
<td>C</td>
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</tr>
<tr>
<td>C</td>
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\[ 0.3 \ 0.1 \ 0 \]
\[ 0 \ 0.1 \ 0 \]
\[ 0.1 \ 0 \ 0 \]

Alignment = 0.6
Using alignment as an outcome measure

Alignment Index:
Instruction to Standards

0.23

0.18

Time 0

Time N

(Measuring change in alignment over time)
Explaining variation in student learning gains

Learning Gains by Course Type

From: *Upgrading High School Mathematics Instruction*, (Gamoran, Porter, Smithson, & White, 1997), EEPAv19n4

Learning Gains Controlling for Content

- Regents
- Algebra
- Stretch Regents
- Math A/B/UCSMP
- Gen. Mth. / Pre-alg.
Accessing SEC Data On & Off-line

SEC Online Log-in: (www.seconline.org)
  Username: __________
  Password: __________

SEC Raw Data CDs:
  by Project
    Data Sets
    Data Notes/Dictionary
    Data Templates
    Summary Measures
SEC Data Analysis – First Steps

Research Questions/Program Goals
Sample Selection
  unit of analysis & grouping
  treatment & comparison/control groups
Constructing the Baseline
  Describe & Classify
  Balance & Natural Variation
  Consistency with Other Data Sources
Analysis of Variance (ANOVA)
Examining Relationships (Corr.)
Analysis of Change \((requires \ 2^{nd} \ round \ of \ data \ collection)\)
Folder: **Data Sets** (excel format)

AAmth2004plus.xls
AAsci2004plus.xls

*File Layout (worksheets):*

Part A Notes   Content Notes
PartAraw       Content Data Tables
Scales         Charts
Sclsum         OutputMtx
Folder: Data Templates

Alignment Templates

**AlignSbjDocTemplate**
(Calculates alignment and produces comparison maps)

Content Map Templates

**GrSbjInstrMapTemplate**
(Creates single map/page content maps)
SEC Summary Measures (Scales)

See these files for Scale definitions and preliminary results of reliability analyses:

- SECmthScales.xls
- SECsciScales.xls
- SECElaScales.xls

Located in the folder “Data templates”
Alignment as a Quantity

The Importance of Grain Size

0.27 (Avg. Alignment: Test to Standard)
Range of Alignment: Test to Standard

0.14 - 0.40

0.59 (Avg. Alignment: Tests to Standards)
Range of Alignment: Tests to Standards

0.49 - 0.70

Fine Grain
Coarse Grain

State U Grade 8 Mathematics Alignment: Test to Standard (0.55)
State U Grade 8 Mathematics Alignment: Test to Standard (0.23)

(Based on results for 10 states, across grades 4, 6 and 8: SEC Collaborative 2003)