Using Data for Programmatic Continuous Improvement and the Preparation of Data Literacy for Educators

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Why Are We Here? Two Issues Related to Data Use

- The use of data for programmatic improvement
  - The policy landscape and why this is important
  - What infrastructure do you need?
  - What data are important?
  - Examples
Why Are We Here? Two Issues Related to Data Use

• The inclusion of data literacy in educator preparation programs
  • What is data literacy
  • Why is it important for you to be aware and take action
  • What we know about the landscape
  • Understanding the challenges and opportunities
  • The systemic nature of change
  • Understanding the skills, knowledge, and dispositions
  • Next steps
Presenting to an Unknown Audience

How many of you....

• Have a robust teacher preparation database that is well integrated into decision-making?

• Are in the intermediate stage of integrating diverse data?

• Are at the beginning stage of identifying, collecting, and integrating data?
A Quote from Tony Bryk (2015)

Data have not been for educators to use to improve.
Another Quote from Tony Bryk (2015)

The field of education is now awash in data, mostly accountability data on students, teachers, schools, and districts. In contrast, improvement research calls for data not for purposes of ranking individuals or organizations, but for learning about how instructional practices and organizational processes actually work. We need evidence to help us discern whether any specific changes attempted are actually improvements.
A Few Questions

Have you ever taken a course on data-driven decision making?
If yes, was it about data or about assessment?
Does your institution offer a class on data-driven decision making?
If yes, is it about data or about assessment?
If yes, who is the targeted audience?
Why is Data-Driven Decision Making Important?

- Emphasis by policymakers (Duncan, Easton, Neild, CAEP, NBPTS)
- Philosophical shift to continuous improvement
  - For Schools of Education
  - For Education Agencies
- Professionalize the profession
- Evidence not gut feelings
- No longer a passing fad
- Helping schools of education improve
- Helping teachers to help all children learn
Why is Data Metrics Important?

- Greater transparency
- Better decisions
- Better resource distribution
- Better landscape view of the program
- Provide a basis for constructive discussion
- Program improvement
- Better tracking of outcomes
- Increase confidence in the profession
What is Data-Driven Decision Making?

Data-based decision making in education refers to teachers, principals, and administrators systematically collecting and analyzing various types of data, including demographic, administrative, process, perceptual, and achievement data, to guide a range of decisions to help improve the success of students and schools. Other common terms include data-driven decision making, data-informed decision making, and evidence-based decision making.

Source: (Hamilton, Halverson, Jackson, Mandinach, Supovitz, & Wayman, 2009)
How Does this Translate to Schools of Education?

Administrators and faculty use data to inform their practice and improve institutional performance through an inquiry cycle where data are collected, analyzed, interpreted, and made actionable to address a problem of practice.
A Cycle of Inquiry

1. Use research to examine impact
2. Identify possible solutions
3. Monitor continuous progress
4. Use data to identify problem
Think About Your Problem of Practice and Ask Pointed Questions
Lead With a Vision and Use a Collaborative Inquiry Process
Try to Take a Broad View and Try Not to Get Stuck in the Mud
Look Carefully at the Data and Nurture Data Use
Consider the Landscape of Data and Show a Hunger to Use Data to Inform Practice
Don’t Run Away from Data Use and Try to Pick Your Data Carefully
Look at Many Sources of Data – You May be Surprised What you Find There
The Purposes of Data: An Important Distinction

Two different and competing objectives

Data for accountability – state overseeing program performance - Compliance

Data for continuous improvement – TPP using data to improve their own performance - Diagnosis
TPPs As Learning Organizations (adapted from Senge, 1990)

- Recognize that TPPs are part of a complex system
- Need to consider the complexity of interactions of the component parts of a system
- Seek to identify underlying structures and causes
- Use data for continuous improvement
- Identify leverage points and determine where and when actions can be taken to affect change
- Rely on the systemic collection and analysis of data for self-reflection and the consideration of consequences
This is About Building a Culture of Evidence or Enculturating Data Use

It takes strong leadership and a vision
It takes collective values and beliefs
It takes organizations policies and practices
Having the right data – compliance vs. diagnostic
The Political Landscape

Offer transparency into the performance of teacher preparation programs, creating a feedback loop among programs and prospective teachers, employers, and the public, and empower programs with information to facilitate continuous improvement.
Proposed Regulations

• Establish:
  • Definitions
  • Indicators
  • Areas
  • Link between state classification and program identification as “high quality”
  • Reporting requirements
  • Consequences for low-performing programs
Why Use Data To Evaluate TPPs?

- Accountability
- Provide consumer information
- Support program self-improvement

- Also to provide a feedback loop between school district and teacher preparation program
Questions to Ask Yourself

• What is the purpose of the evaluation and data collection?
• What matters most?
• What sources of evidence do we need?
• What measures will be used and how will the data be analyzed?
• What are the intended and unintended consequences?
• How will the evaluation be monitored and transparency achieved?
• Are the data meaningful? Actionable? Accurate?
Some Considerations

• Are the data aligned to program improvement efforts?
• Will the data be actionable?
• Are we using multiple and diverse measures, including observations and surveys?
• Are the measures valid for our purposes?
• Are we measuring differential effects?
• Is our logic model sound?
• Are there MOU’s in place?
• Are you reporting on program features, not just outcomes?
A Key Consideration

Can you make the data/information actionable?
Can the data be transformed into some kind of actionable decision?
**Strategies** (from Peck, McDonald, & Davis)

Motivate and engage faculty
Make time and space for data use
Build a useful data platform
Create a common and concrete language of practice
Manage the dynamics of dissent
Motivate and Engage the Faculty

- Develop a shared vision to use data
- Group discussions
- Articulate values
- Capitalize on individual practice -> collective learning

Examine the data
Distributed leadership
Make Time and Space for Data Use

Prioritize
Incentivize
Stress data use is not an added burden but a part of the job
Enculturate – integrate data into organizational routines

Hold a data summit
Remove some other activities
Design meetings around looking at data
Make data accessible
Change personnel policies, if possible
Build a Useful Data Platform

Create useful electronic data platform
Must support inquiry
Able to deal with diverse data sources
Archival capacity

User-centered design
Accessible and transparent
Drill-down capacity
Adaptable over time
Multi-modal
Not burdensome
Integrate Data from Silos

Many data platforms proliferate across the institution
Not all talk to each other
Data exist in different forms
Integrating users is difficult

Cross department collaboration
Supported by institution-wide focus on data
May require negotiation to steward data
Create a Common Language of Practice

- Shared understanding
- Clear and consistent
- Lay out expectations for performance
- Identify key concepts and practices
- Community of practice

Develop a shared language
Build collaborations
Managing Dissent

Encourage faculty to express their views about data
Encourage constructive critique contributing to program improvement
Create a tone of low threat and mutual respect
Focus on actions toward shared goals

Listen
Determine how faculty are feeling
Structure deliberate discussions
Keep emotions out of it
Key Indicators for States from TPPs

• Employment outcomes: New teacher placement and three-year retention rates, including in high-need schools
• Teacher and employer feedback: Surveys on the effectiveness of preparation
• Student learning outcomes: Effectiveness of new teachers as demonstrated through measures of student growth, performance on state or local teacher evaluation measures that include data on student growth, or both, during their first three teaching years
• Assurance of specialized accreditation, or evidence that a program produces candidates with content and pedagogical knowledge and quality clinical preparation, who have met rigorous entry and exit requirements.
From Deans for Impact (2016)

- Patchwork of data
- Few common data sources
- Internally developed instruments
- Lack of meaningful data
- Need timely and fine-grained data
- Improved access to actionable data
- Outcomes-focused certification process
From Deans for Impact (2016)

- Completer or Graduate Survey (78%)
- Employer Survey (74%)
- Employment Status and Location (65%)
- Long-term Retention (35%)
- Classroom Observation of Graduates (26%)
- Student Achievement (26%)
- Teacher Evaluation Scores of Graduates (26%)
From Deans for Impact (2016) – Program Data Landscape

- **PRE-ENROLLMENT** - Admitted demographic, Admitted undergraduate GPA, Admitted SAT/ACT, Application completion rate
- **ENROLLED** - Candidate demographic, Candidate cumulative GPA, Candidate entry survey, Candidate dispositional survey, Candidate performance on key assignments, Candidate evaluation of course/faculty, Clinical experience observation, Mentor/supervising teacher survey, Survey of principal at clinical experience site, Student/achievement at clinical experience site, Candidate focus group, Candidate exit survey, Candidate survey (other), performance assessment
- **POST-ENROLLMENT** - Complete or graduate survey, Employment states and location, Long-term retention, Employer survey, Classroom observation of graduates, Student achievement, Teacher evaluation scores of graduates
From CAEP

Data drive decisions about candidates and programs

• Decisions are based on evidence from multiple measures of candidates’ learning, completers’ performance in the schools and school and community conditions and needs.

• The unit has a system for routine self-assessment based on a coherent logic that connects the program’s aims, content, experiences and assessments.

• The reliability and validity of each assessment measure are known and adequate, and the unit reviews and revises assessments and data sources regularly and systematically.

• The unit uses data for program improvement and disaggregates the evidence for discrete program options or certification areas.
TPP Effectiveness Indicators (from Allen, Coble, & Crowe)

- Candidate Selection Profile
  - Academic Strength (prior achievement, test performance)
  - Teaching Promise (attitudes, values, behaviors)
  - Candidate/Completer Diversity

- Knowledge and Skills for Teaching
  - Content Knowledge
  - Pedagogical Content Knowledge
  - Teaching Skill
  - Completer Rating of Program
TPP Effectiveness Indicators.2 (from Allen, Coble, & Crowe)

- Performance as Classroom Teachers
  - Impact on K-12 Students
  - Demonstrated Teaching Skill
  - K-12 Student Performance
- Program Productivity, Alignment to State Needs
  - Entry and Persistence in Teaching
  - Placement/Persistence in High-Need Subjects/Schools
## Linking Attributes to Measures and Data Elements

(from Feuer, Floden, Chudowsky, & Ahn, 2013)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions and recruitment criteria</td>
<td>GPA of incoming class&lt;br&gt;Average entrance exam scores (e.g., SAT, ACT)&lt;br&gt;Percentage of minority students in incoming class&lt;br&gt;Number of candidates in high-need subject areas and specialties</td>
</tr>
<tr>
<td>Quality and substance of instruction</td>
<td>Course syllabi&lt;br&gt;Lectures and assignments&lt;br&gt;Textbooks&lt;br&gt;Course offerings and required hours&lt;br&gt;Required content courses</td>
</tr>
<tr>
<td>Quality of student teaching experience</td>
<td>Fieldwork policies, including required hours&lt;br&gt;Qualifications of fieldwork mentors&lt;br&gt;Surveys of candidates&lt;br&gt;Records from observations of student teaching</td>
</tr>
<tr>
<td>Faculty qualifications</td>
<td>Percentage of faculty with advanced degrees&lt;br&gt;Percentage of faculty that are full-time, part-time, adjunct</td>
</tr>
<tr>
<td>Effectiveness in preparing new teachers who are employable and stay in the field</td>
<td>Pass rates on licensure tests&lt;br&gt;Hiring and retention data</td>
</tr>
<tr>
<td>Success in preparing high-quality teachers</td>
<td>Teacher performance assessments administered near end of program&lt;br&gt;Ratings of graduates by principals/employers&lt;br&gt;Value-added estimates</td>
</tr>
</tbody>
</table>
Data Sources: What Data Elements Do You Have About.....? And What Are You Missing?

- Employment
- Teacher characteristics
- Classroom characteristics
- School characteristics
- Teacher outcomes
Organizational Capacity and Questions

- Do you have a sufficient data system?
- Do you have institutional research capacity?
- Do you have the cooperation of school districts?
- Have you created a data culture within the institution?
- Are the data actionable?
- Will you take action on the data?
Example from the CAEP University Supervisor Survey: Sample Items on Instructional Practice

The teacher effectively teaches the subject matter in his/her licensure area.
The teacher creates activities that are appropriate for her/his students’ social/emotional needs.
The teacher creates assignments that are at the appropriate level of difficulty for her/his students’ diverse learning needs.
The teacher uses a variety of instructional strategies to support student learning in the subject(s) she/he teaches.
The teacher integrates a variety of media and educational technology into instruction.
The teacher plans lessons with clear learning objectives/goals in mind.
The teacher designs long-range individual plans that meet curricular goals.
Other Examples and Promising Practices: Much Like Schools

- Hold a data summit, retreat, or data days
- Conduct shared scoring of performance assessments such as the edTPA
- Rely on collaborative inquiry
- Use a distributed leadership model
- Obtain faculty input
- Create an open and trusting environment for discourse
- Create an afternoon solely for faculty meetings
- Institutionalize data teams
**Resources**


Data Literacy For Teachers

The purpose of data collection is to guide your instruction.
Data literacy for teaching is the ability to transform information into actionable instructional knowledge and practices by collecting, analyzing, and interpreting all types of data (assessment, school climate, behavioral, snapshot, longitudinal, moment-to-moment, etc.) to help determine instructional steps. It combines an understanding of data with standards, disciplinary knowledge and practices, curricular knowledge, pedagogical content knowledge, and an understanding of how children learn.
A Definitional Problem

Data Literacy is conflated with assessment literacy. Two different but overlapping constructs. The distinction is very important for schools of education.
Data-Driven Decision Making: An Identity Problem?

- Sage Catalog: Data-Driven Decision Making
  - Modern Classroom Assessment
  - Sage Handbook of Research on Classroom Assessment
- Sage Catalog: Classroom/Student Assessment
  - Transforming Teaching and Learning Through Data-Driven Decision Making
Why Now? Data Rich But Information Poor

• Emerging technological solutions from complex data systems to data dashboards
• Proliferation of diverse data sources
• The building of human capacity has not kept up with the development of the technological infrastructure
• Even if educators know they should become data-informed, there are still many challenges
Why Is it Important for Schools of Education to Take Note and Take Action?

- Accountability in action for schools of education and for teacher candidates
- You are being held accountable for the performance of your graduates
- Your graduates are being held accountable for their performance
- edTPA, Praxis, and NOTE
What We Know About the Landscape

- It is now essential for educators to be data literate; that is, know how to use data effectively and responsibly.
- Professional development providers cannot do it alone.
- Professional development and in-service training are sporadic, of questionable quality, and too late in educators’ careers.
- Data training should begin as early as possible.
- Integration of data literacy into content and methods courses is the recommended approach.
- Stand-alone courses can be a good addition.

“It’s a good thing all of our data is stored in the cloud.”
Findings from our Landscape Study

- 62% of the respondents to the survey reported having a stand-alone data course; 92% reported integrating data concepts into other courses.
- A deep dive into the syllabi indicates courses are really assessment courses, not data courses.
- State licensure includes data literacy but more states focus on assessment literacy than data literacy.
- States that abide by the InTASC standards are heavily data oriented.
- All but one state has some requirement around data use.
- Hiring practices from districts can exert influence.
Themes from our Case Studies

• The importance of leadership and vision
• Staffing
• Sustainability
• Use of data for continuous improvement
• Course design
• Integration of data skills with content and pedagogy
• Data literacy versus assessment literacy
• Practica
• Links to schools and districts
What We Do Not Know About the Landscape

• How to overcome some of the issues along the developmental continuum
• What is the lowest acceptable level of content knowledge to make use of data skills
• What is the lowest acceptable level of pedagogical content knowledge
• What does the progression from data novice to data native look like
• What is the best leverage point to affect change in teacher preparation short of accountability pressure
• How to overcome the hurdle of academic freedom to get data literacy integrated into existing courses
There Are Legitimate Challenges

- No one to teach a stand-alone course
- No wiggle room in the curriculum
- Hiring priorities are elsewhere with faculty slots
- Don’t see the need
- How to convince faculty to integrate data concepts into their courses without violating academic freedom
- How to convince faculty that data-driven decision making is important
Are There Other Challenges We Have Missed?

Let us hear from you......
What Will Help You Take the Plunge?
Systemic Players in Affecting Change

- Schools of education
- State licensure agencies
- School districts – hiring decisions
- Professional organizations
- Testing agencies
- Professional development providers
- U.S. Education Department
Some Real Questions with Hopefully Hair-Raisingly Honest Responses

• To what extent does your institution pay attention to state requirements for licensure and certification?
• How much influence do the licensure/certification tests wield on your institution?
• Do your feeder school districts affect your decisions?
So Now That We Have Discussed the Landscape, Let’s Think........

What does the conceptual framework for data literacy for teachers look like?

What are the skills, knowledge, and dispositions that comprise the construct?
Two Views of the Conceptual Framework for Data Literacy for Teachers: View 1
Two Views of the Conceptual Framework for Data Literacy for Teachers: View 2
The Conceptual Framework

DLFT
The Domain of Data Use for Teaching

INQUIRY CYCLE

- Articulate and communicate the problem/question
- Involve other participants
- Understand student privacy
- Understand contextual issues

Evaluate outcomes
- Identify problems/Frame questions

Use data
- Identify possible sources of data
- Understand how to generate data
- Understand data properties
- Understand data quality
- Understand how to access data
- Understand how to analyze data

Transform data into information
- Consider impact and consequences (intended and unintended)

Generate hypotheses
- Test assumptions
- Understand how to interpret data

Determine next instructional steps
- Understand context for the decision

Re-examine original question or problem
- Consider need for iterative decision cycles
The Elements of Data Use

Identify problems/frame questions

Use data
The Elements of Transform Data to Information

1. **Identify problems/Frame questions**
2. **Use data**
3. **Transform data into information**
4. **Transform information into decisions**
5. **Evaluate outcomes**

- **INQUIRY CYCLE**
- **Consider impact and consequences (intended and unintended)**
- **Generate hypothetical connections to instruction**
- **Test assumptions**
- **Understand how to interpret data**

- **Understand data displays and representations**
- **Assess patterns and trends**
- **Probe for causality**
- **Synthesize diverse data**
- **Summarize and explain data**
- **Articulate inferences and conclusions**

- **Use statistics**
Transform Information to Decision and Evaluate Outcomes Components

The elements
Identify Problems/Frame Questions

Articulate the problem
Understand contextual issues – student level
Understand contextual issues – school level
Involve other participants
Frame questions
Understand student privacy
Use Data

Understand specificity of data to question/problem
Understand what data are not applicable
Identify possible data sources
Understand the purposes of different data sources
Use multiple measures/sources of data
Understand how to generate data
Identify and develop fair, reliable, and valid assessments
Use Data.2

Develop and implement both formative and summative assessments
Understand aspects of data quality
Identify inaccurate, misleading, or out of range data
Understand the appropriate level of data
Understand and apply basic statistics
Access data
Use technologies to support data use
Transform Data Into Information

Analyze data
Examine possible relationships or causes
Consider impact and consequences (intended and unintended)
Test assumptions
Generate hypotheses
Predict possible or likely consequences
Understand and use data displays and representations
Assess patterns and trends
Synthesize and summarize diverse data
Communicate at an appropriate level for audience
Probe for causality
Transform Information Into a Decision

Apply understanding of context for the decision
Determine next steps
Monitor
Diagnose
Make instructional adjustments
Evaluate Outcomes

Consider need for iterative decision cycle
Re-analyze original question or decision
Compare data pre- and post-decisions
Monitor for student changes
Monitor for classroom practice changes
Determine any unintended consequences
Next Steps

• Have internal discussions about how data concepts can be integrated into existing courses
• Do a diagnostic assessment of what skills, knowledge, and dispositions are taught and where
• Have conversations with school districts about their requirements and hiring decisions
• Consider what resources are needed
• Capitalize on existing and soon-to-be developed materials
• We are happy to help.........
You Have a Choice
Or......
Keeping with the Metaphor
How Many Psychologists Does it Take to Change a Light Bulb?
Resources

- Data for Decisions Initiative at WestEd - Datafordecisions.wested.org
- Data Quality Campaign - Dataqualitycampaign.org
  - Data Quality Campaign. (n.d.). Roadmap for educator licensure policy addressing data literacy: Key focus areas to ensure quality. Washington, DC: Author
- The work of Peck and McDonald at the University of Washington
- Using Data for Program Improvement: A Study of Promising Practices in Teacher Education
- Courses
  - Virtual Course from the Using Data Project at TERC
    » using_data@terc.edu or call 617-873-9639.
    » http://usingdata.terc.edu/workshops/online_courses.cfm
  - MOOC from the Data Wise group at Harvard www.edx.org or
    » https://www.edx.org/course/introduction-data-wise-collaborative-harvardx-gse3x
A Forthcoming Resource Next Month

Data Literacy for Educators
Making It Count in Teacher Preparation and Practice

Ellen B. Mandinach and Edith Gummer
Foreword by Barbara Schneider
A Near-Final Thought?

What is the difference between elephants mating and change in higher education?
Contact Information

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A Diagnostic Exercise For You

• Let’s look at the list of skills, knowledge, and dispositions and discuss:
  • If SKDs are taught in your curricula, where? In stand-alone courses? Embedded?
  • In which courses? In Methods? In Pedagogy? In Foundations? In Assessment? In Content?
  • if not, where could the SKDs be integrated
Questions and Thoughts?