Training Future Teachers to Implement Evidence-based Reading Interventions: Developing Meaningful RtI Field Experiences and Measuring Outcomes
Human Development Center Website for Materials

- http://www.uwec.edu/HDC/resources.htm
• We have no conflicts of interest associated with the research presented from this project
• Funding for the project provided, in part, by the DPI SPDG Mini Grant and the UWEC Blugold Commitment/Differential Tuition Award
Today’s Agenda

1. RtI and shortcoming associated with how we train pre-service educators
2. Elements within RtI that require pre-service training
3. Brief Experimental Analysis as one method within an RtI framework
4. Training pre-service educators to implement BEA
5. Training Outcomes
6. Next Steps and Discussion
The Three Tiered Service Delivery Model (Reschly, 2008)

A model that emphasizes
- Evidence-based practice
- Matching instruction and intervention to student needs
- Implementation fidelity
- Ongoing formative evaluation
- Self-correction

An increased focus on accountability across the system
New System, New Skills

- Statewide needs assessment (Wisconsin RtI Center, 2010)
- Development
- Implementation
- Evaluation
Professional Development Needs

- Implementation (Kilgallen, 2008)
- Leadership (Machek & Nelson, 2010)
- Academic and Behavioral Intervention (Wisconsin RtI Center, 2010)
- General knowledge and skills (Mastropieri & Scruggs, 2005)
At the Pre-service Level

- Contributions from nationally prominent professional organizations (e.g., CEC, NASP)
  - Standards
  - Professional competencies
- Specifically...
  - How to evaluate scientific evidence for practice
  - Evidence-based instruction and intervention for high incidence populations
  - Teaming and problem-solving
  - Data-based decision making
  - Cultural appropriateness
Statement of the Problems

- Problem #1: Lack of meaningful RtI field experiences
- Problem #2: Target competencies
- Problem #3: Measure outcomes
Objectives of our Project

- Design and field-test a pre-service interdisciplinary RtI training experience
- Engage in meaningful evaluation of outcomes for professional trainees
What Elements Within RtI Need Training?

- Universal Screening to identify students who are at-risk for various academic skills
- Linking assessment results to an appropriate intervention
  - Implementing an intervention correctly

(Batsche, Castillo, Dixon, & Forde, 2008; Ikeda, Neessen, & Witt, 2008)
Elements of RtI Requiring Training

- Progress monitoring
- Using the problem solving model to guide assessment and intervention within the three-tiered model
- How to collaborate effectively with other disciplines to address all elements of RtI
- Using data to inform educational decisions

(Shapiro, 2011; Tilly, 2008)
Brief Experimental Analysis (BEA)

- Links assessment data to intervention
- Allows practitioners to “test drive” the effects of two or more interventions
- Data points from the interventions are compared to one another and to the baseline data
  - Able to determine which intervention will be most effective

(Burns & Wagner, 2008)
Our BEA Model

“Test drive” six different interventions

- Repeated Reading (RR)
- Listening Passage Preview (LPP)
- Sight Words (SW)
- RR + LPP
- RR + SW
- LPP + SW
- RR + LPP + SW
Intervention: Repeated Reading

Bayley

Correct Words Per Minute (CWPM)


Intervention: Repeated Reading
1. Interventionists have firm understanding of the principles and procedures of Brief Experimental Analysis.

2. Interventionists understand the purpose and process of baseline data collection.

3. Interventionists demonstrate correct method of calculating Correct Words Per Minute (CWPM).

4. Interventionists recognize the purpose and importance of progress monitoring and outcome measurement.
Didactic Instruction

50 Minute Training Presentation Includes:

- Evidence-Based Practice
- BEA Background and Procedures
  - Detailed Explanation of Steps
- Method of Progress Monitoring
- Feedback
- Expectations
  - We address relationship-building with students, attention to detail in paperwork, and the importance of communication and professionalism
Example

Video Clip: Didactic Instruction
Progress Monitoring

- Student involvement
- Specific instruction for interventionists on data collection and monitoring
  - Enhances relationship building and student interest
- Continued coaching, practice, integrity checks and feedback is necessary after training
Rehearsal

- Provide training time for interventionists to practice treatment fidelity through the use of modeling and practice

- Modeling: Important component of training model
  - Repetition and feedback still necessary for learning to take place
Feedback

- Audio recorders reviewed weekly
- Written and verbal performance feedback provided to interventionists as needed
  - Immediate
  - Specific
  - Formative
    - Common Examples: Remember to complete HCO passage; time for one minute *exactly*; label and organize paperwork correctly; read passage through entirely, etc.
  - Summative
    - Treatment integrity, child outcomes
Example

Collecting Baseline Data
Example

Intervention: Listening Passage Preview
1. (Elementary) Student outcome data
2. Procedural integrity data
3. Measurement fidelity (i.e., interrater reliability)
4. Professional practice portfolios
5. Social validity data
6. Action research examples
Interventionist Demographics: Year in School

- Freshman (12%)
- Sophomore (7%)
- Junior (15.5%)
- Senior (39%)
- 5th Year Senior (7%)
- Graduate Student (19.5%)
Interventionist Demographics: Majors

- Com Dis (23%)
- Education (23%)
- Psychology (23%)
- School Psychology (15%)
- Other (8%)
- Social Work (4%)
- Undeclared (4%)
### 1. (Elementary) Student Outcome Data: School #1

<table>
<thead>
<tr>
<th>Student</th>
<th>Baseline Beginning of Semester (Mean CWPM)</th>
<th>Last 3 Weeks Intervention (Mean CWPM)</th>
<th>Baseline End of Semester (Mean CWPM)</th>
<th>Percent Growth (Beginning to End Baseline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keegan</td>
<td>56.6</td>
<td>77</td>
<td>71.3</td>
<td>26%</td>
</tr>
<tr>
<td>Naomy</td>
<td>42</td>
<td>49</td>
<td>46.6</td>
<td>11.1%</td>
</tr>
<tr>
<td>Ethan</td>
<td>22</td>
<td>50</td>
<td>28.3</td>
<td>28.8%</td>
</tr>
<tr>
<td>Alyssa</td>
<td>29</td>
<td>56</td>
<td>44.3</td>
<td>52.9%</td>
</tr>
<tr>
<td>Harry</td>
<td>104.6</td>
<td>123</td>
<td>114</td>
<td>9%</td>
</tr>
<tr>
<td>Devon</td>
<td>54</td>
<td>88</td>
<td>74.6</td>
<td>38.3%</td>
</tr>
<tr>
<td>Malila</td>
<td>84</td>
<td>105</td>
<td>74.3</td>
<td>-11.5%</td>
</tr>
<tr>
<td>Cheyenne</td>
<td>94</td>
<td>98</td>
<td>95.6</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

IHE Summer Institute Presentation

May 2012
## 1. (Elementary) Student Outcome Data: School #2

<table>
<thead>
<tr>
<th>Student</th>
<th>Baseline Beginning of Semester (Mean CWPM)</th>
<th>Last 3 Weeks Intervention (Mean CWPM)</th>
<th>Baseline End of Semester (Mean CWPM)</th>
<th>Percent Growth (Beginning to End)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJ</td>
<td>59.3</td>
<td>78.8</td>
<td>92</td>
<td>55.1%</td>
</tr>
<tr>
<td>Tyler</td>
<td>63.3</td>
<td>101.6</td>
<td>91.3</td>
<td>44.2%</td>
</tr>
<tr>
<td>Kavin</td>
<td>102.3</td>
<td>128</td>
<td>131.3</td>
<td>28.3%</td>
</tr>
<tr>
<td>Payton</td>
<td>103.6</td>
<td>117.2</td>
<td>105.3</td>
<td>1.6%</td>
</tr>
<tr>
<td>Bayley</td>
<td>73</td>
<td>101.8</td>
<td>98</td>
<td>39.5%</td>
</tr>
<tr>
<td>Jordon</td>
<td>61.6</td>
<td>90.8</td>
<td>89.6</td>
<td>45.5%</td>
</tr>
<tr>
<td>Jacob</td>
<td>73.6</td>
<td>109</td>
<td>93.3</td>
<td>26.8%</td>
</tr>
<tr>
<td>Mandy</td>
<td>37</td>
<td>82.8</td>
<td>81</td>
<td>118.9%</td>
</tr>
<tr>
<td>Malia</td>
<td>31</td>
<td>84</td>
<td>170.9%</td>
<td></td>
</tr>
<tr>
<td>Blaze</td>
<td>91.6</td>
<td>114.6</td>
<td>25.2%</td>
<td></td>
</tr>
</tbody>
</table>
Mandy

Intervention: RR

Correct Words Per Minute (CWPM)
Correct Words Per Minute (CWPM)

- Baseline
- RR
- LPP
- SW
- SW+RR
- SW+LPP
- LPP+RR
- SW+RR+LPP
- Intervention:
  - SW+LPP

Austin

May 2012
## 2. Procedural Integrity Data

<table>
<thead>
<tr>
<th>Student</th>
<th>Percentage Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keegan</td>
<td>100%</td>
</tr>
<tr>
<td>Naomy</td>
<td>97.1%</td>
</tr>
<tr>
<td>Ethan</td>
<td>97.8%</td>
</tr>
<tr>
<td>Alyssa</td>
<td>94%</td>
</tr>
<tr>
<td>Harry</td>
<td>94%</td>
</tr>
<tr>
<td>Devon</td>
<td>93.9%</td>
</tr>
<tr>
<td>Malila</td>
<td>92.2%</td>
</tr>
<tr>
<td>Cheyenne</td>
<td>98.5%</td>
</tr>
<tr>
<td>CJ</td>
<td>100%</td>
</tr>
<tr>
<td>Austin</td>
<td>97.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student</th>
<th>Percentage Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tyler</td>
<td>95.5%</td>
</tr>
<tr>
<td>Kavin</td>
<td>97.4%</td>
</tr>
<tr>
<td>Peyton</td>
<td>98.5%</td>
</tr>
<tr>
<td>Bayley</td>
<td>96.7%</td>
</tr>
<tr>
<td>Jordon</td>
<td>97.8%</td>
</tr>
<tr>
<td>Jacob</td>
<td>98.1%</td>
</tr>
<tr>
<td>Mandy</td>
<td>97.1%</td>
</tr>
<tr>
<td>Malia</td>
<td>94.2%</td>
</tr>
<tr>
<td>Blaze</td>
<td>95.5%</td>
</tr>
<tr>
<td>Nathan</td>
<td>96.7%</td>
</tr>
</tbody>
</table>
## 3. Measurement Fidelity

<table>
<thead>
<tr>
<th>Student</th>
<th>Percentage Agreeability (CWPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keegan</td>
<td>100%</td>
</tr>
<tr>
<td>Naomy</td>
<td>96.2%</td>
</tr>
<tr>
<td>Ethan</td>
<td>97.8%</td>
</tr>
<tr>
<td>Alyssa</td>
<td>98.5%</td>
</tr>
<tr>
<td>Harry</td>
<td>96%</td>
</tr>
<tr>
<td>Devon</td>
<td>98.6%</td>
</tr>
<tr>
<td>Malila</td>
<td>89.9%</td>
</tr>
<tr>
<td>Cheyenne</td>
<td>100%</td>
</tr>
<tr>
<td>CJ</td>
<td>100%</td>
</tr>
<tr>
<td>Austin</td>
<td>99.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student</th>
<th>Percentage Agreeability (CWPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tyler</td>
<td>97.3%</td>
</tr>
<tr>
<td>Kavin</td>
<td>99%</td>
</tr>
<tr>
<td>Peyton</td>
<td>96.2%</td>
</tr>
<tr>
<td>Bayley</td>
<td>98.5%</td>
</tr>
<tr>
<td>Jordon</td>
<td>97.5%</td>
</tr>
<tr>
<td>Jacob</td>
<td>97.2%</td>
</tr>
<tr>
<td>Mandy</td>
<td>98.1%</td>
</tr>
<tr>
<td>Malia</td>
<td>98.7%</td>
</tr>
<tr>
<td>Blaze</td>
<td>98.2%</td>
</tr>
<tr>
<td>Nathan</td>
<td>97.5%</td>
</tr>
</tbody>
</table>
4. Professional Practice Portfolios

- Adapted from the *Problem Solving Case Study Rubric* (Tusing, 2011)
- Domains assessed
  - Problem Identification
  - Baseline Data Collection
  - Intervention Description
  - Formative & Summative Evaluation
  - Data-based Decision Making
  - Intervention Integrity
- Evaluation Method
  - 3 – Very Effective/Advanced; 2 – Effective/Proficient; 1 – Needs Development
  - Relative to level of training/experience
Professional Portfolio Data

- Spring 2012 (n=12)
- Mean Overall Score: 2.69 (range: 2-3)
- Domains Score Means
  - Problem Identification: 2.5
  - Baseline Data Collection: 2.83
  - Intervention Description: 2.75
  - Formative & Summative Evaluation: 2.67
  - Data-based Decision Making: 2.83
  - Intervention Integrity: 2.58
- No scores of 1
- 4 students achieved a perfect “3”
• Are treatment goals and outcomes acceptable, socially relevant, and useful? (Kazdin, 1977; Wolf, 1978)
• Perceptions regarding goals, procedures, and outcomes (Lindo & Elleman, 2010)
• Critical when evaluating pre-service educators’ impact on students
### Acceptability Data from School Staff

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students improved their reading fluency as a result of participation in the afterschool reading program</td>
<td>4.78</td>
</tr>
<tr>
<td>The interventionists working with students were effective in improving students’ reading fluency</td>
<td>4.75</td>
</tr>
<tr>
<td>The feedback provided by the interventionist was helpful in planning other interventions for students</td>
<td>4.31</td>
</tr>
</tbody>
</table>
### 5. Social Validity Data

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean Fall 2011</th>
<th>Mean Sp 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEA would be an acceptable assessment procedure to target a child’s reading fluency problems</td>
<td>4.82</td>
<td>4.83</td>
</tr>
<tr>
<td>Most school staff would recommend BEA when targeting reading fluency problems</td>
<td>4.46</td>
<td>4.58</td>
</tr>
<tr>
<td>BEA would be effective at improving reading fluency</td>
<td>4.64</td>
<td>4.75</td>
</tr>
<tr>
<td>I would recommend BEA to other school staff</td>
<td>4.56</td>
<td>5.0</td>
</tr>
<tr>
<td>BEA would be appropriate for a variety of students</td>
<td>4.10</td>
<td>4.83</td>
</tr>
<tr>
<td>BEA is a fair amount of work for as student to do</td>
<td>4.10</td>
<td>4.50</td>
</tr>
<tr>
<td>BEA takes a reasonable amount of time for school staff to implement</td>
<td>4.10</td>
<td>4.10</td>
</tr>
<tr>
<td>I liked the procedures used in the BEA</td>
<td>4.64</td>
<td>4.58</td>
</tr>
<tr>
<td>Children are motivated to complete the BEA procedures</td>
<td>3.91</td>
<td>3.83</td>
</tr>
<tr>
<td>Overall, BEA would benefit a student’s reading fluency</td>
<td>4.55</td>
<td>4.83</td>
</tr>
</tbody>
</table>
More Social Validity Data

- Asked students “How comfortable are you with the BEA procedures?” (1 to 6 Likert-scale)
  - Spring 2012: 5.36
Applying Brief Experimental Analysis to Empirically Select Interventions that Improve Oral Reading Fluency
Allison K. Gehring and Dr. Michael Axelrod
University of Wisconsin-Eau Claire, Psychology Department

Introduction
- Reading to read is challenging for many students.
- Less than half of the county’s fourth, eighth, and tenth grade students meet or exceed the proficient level (National Center for Educational Statistics, 2007).
- The current model in the state of Wisconsin requires teachers to identify students in need of reading intervention immediately after they are identified as needing instruction.
- Teachers typically select interventions based on personal preferences and recommendations from others.
- This method is not the best because it does not account for student differences and learning.
- Implementing effective interventions in academically underachieving students might help educators implement effective data-based decision making.

Method
- Participants and setting:
  - Students identified as needing reading intervention were selected.
  - The study was conducted in an elementary school in a medium-sized, suburban city.
- Students were identified by the school's reading specialists.
- The purpose of the study was to evaluate BPA as a tool to identify effective reading interventions for non-added-practice groups.

Results and Discussion
- The study was conducted in an elementary school in a medium-sized, suburban city.
- The study was conducted during the school's after-school program.
- Dependent Measure:
  - Center word read per minute (CWRP). Students read a list of 50 words for six minutes.
- Condition:
  - Experimental Group (EG): Students read the same passage five times, and the reading rate and accuracy were measured.
  - Control Group (CG): Students read the passage five times, and the reading rate and accuracy were recorded for one minute and data were collected.
- Treatment:
  - Targets (TG): Students read the target passage two times, the treatment group was given the treatment, and data were collected.
- Procedure:
  - Step 1: Administer pretest.
  - Step 2: Treat intervention.
  - Step 3: Perform posttest.
  - Step 4: Compare pretest and posttest.
  - Step 5: Conduct follow-up data.
Another Action Research Example
And Another Action Research Example

Investigating the Consistency of Results Obtained from a Brief Experimental Analysis of Oral Reading Fluency

Christine A. Schounard, Maddie J. Sutton, & Michael I. Axelrod, Ph.D.
Psychology Department & Human Development Center
University of Wisconsin-Eau Claire

Introduction

Brief Experimental Analysis (BEA) is a collection of procedures that assess various interventions used to improve Oral Reading Fluency. BEA assumes that changes in instructional variables (e.g., intervention) can have a profound impact on student performance.

BEA has multiple purposes, including validating instructional changes to improve the consistency of BEA outcomes. This study contained 21 participants who met specific criteria. The participants were divided into groups based on their performance on a pretest.

Method

Participants were 21 elementary age students referred to an after school reading program because of poor reading achievement.

Dependent Variables

• Interventions used in BEA assessment
• Baseline student oral reading passage for 1 minute.
• Oral reading (OR) analysis was performed at monthly intervals (i.e., once per month) with a CPMP record on oral reading.
• Oral reading (OR) analysis was performed at monthly intervals (i.e., once per month) with a CPMP record on oral reading.
• Oral reading (OR) is used to indicate the number of words read correctly per minute.
• Oral reading (OR) is used to indicate the number of words read correctly per minute.

Procedure

The participants were assessed on their oral reading fluency on a monthly basis. The results were recorded and analyzed using the CPMP system. The participants were then instructed to continue reading the same level of material for the remainder of the school year.

Results

Table 1

<table>
<thead>
<tr>
<th>Student</th>
<th>October 2010 BEA Intervention</th>
<th>February 2011 BEA Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>arabic</td>
<td>RR-LP</td>
<td>SW-LP-RR</td>
</tr>
<tr>
<td>Carter</td>
<td>SW-LP-RR</td>
<td>SW-LP-RR</td>
</tr>
<tr>
<td>Kelly</td>
<td>SW-LP-RR</td>
<td>SW-LP-RR</td>
</tr>
<tr>
<td>David</td>
<td>SW-LP-RR</td>
<td>RR</td>
</tr>
<tr>
<td>Jordan</td>
<td>SW-LP-RR</td>
<td>SW-LP-RR</td>
</tr>
<tr>
<td>Kelly</td>
<td>SW-LP-RR</td>
<td>RR</td>
</tr>
<tr>
<td>Michael</td>
<td>SW-LP-RR</td>
<td>SW-LP-RR</td>
</tr>
<tr>
<td>Amanda</td>
<td>SW-LP-RR</td>
<td>SW-LP-RR</td>
</tr>
<tr>
<td>Ashley</td>
<td>SW-LP-RR</td>
<td>SW-LP-RR</td>
</tr>
<tr>
<td>Arabella</td>
<td>SW-LP-RR</td>
<td>SW-LP-RR</td>
</tr>
</tbody>
</table>

Discussion

Results indicate that the participants randomly chose an intensity of BEA interventions from October to February assessment.

It is likely that individual differences in participants contributed to the changes in BEA interventions selected. The results are not surprising, given BEA assessment is used to empirically select individualized interventions.

These results suggest practitioners using BEA should consider conducting BEA assessments at least every four months.

The study was limited by the small sample size.

References


Table 2

<table>
<thead>
<tr>
<th>Change</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
</table>
| No Change of Intervention | 29 | 59%
| Change | 15 | 30% |

Acknowledgements

Financial support for this research was provided by the Office of Research and Sponsored Programs (ORSP) and the Differential Tuition Program.

Thank you to all the reading instructors who helped collect data and for the elementary school for providing us with opportunities to work with students.

Thank you to Dr. Axelrod for helping develop the study.

Presented at the University of Wisconsin-Eau Claire Annual Student Research Day.
May 24, 2011.


What’s next?

What we’ve learned:
- The experience has an impact
- Interdisciplinary collaboration is really fun
- Foundational knowledge and skills vary greatly
- Need motivated partners
- Need talented leaders
- Need faculty time

Where do we go from here?