Evidence Based Interventions:
Specific Learning Disorder in Reading (SLD-R) in
Word Reading Accuracy

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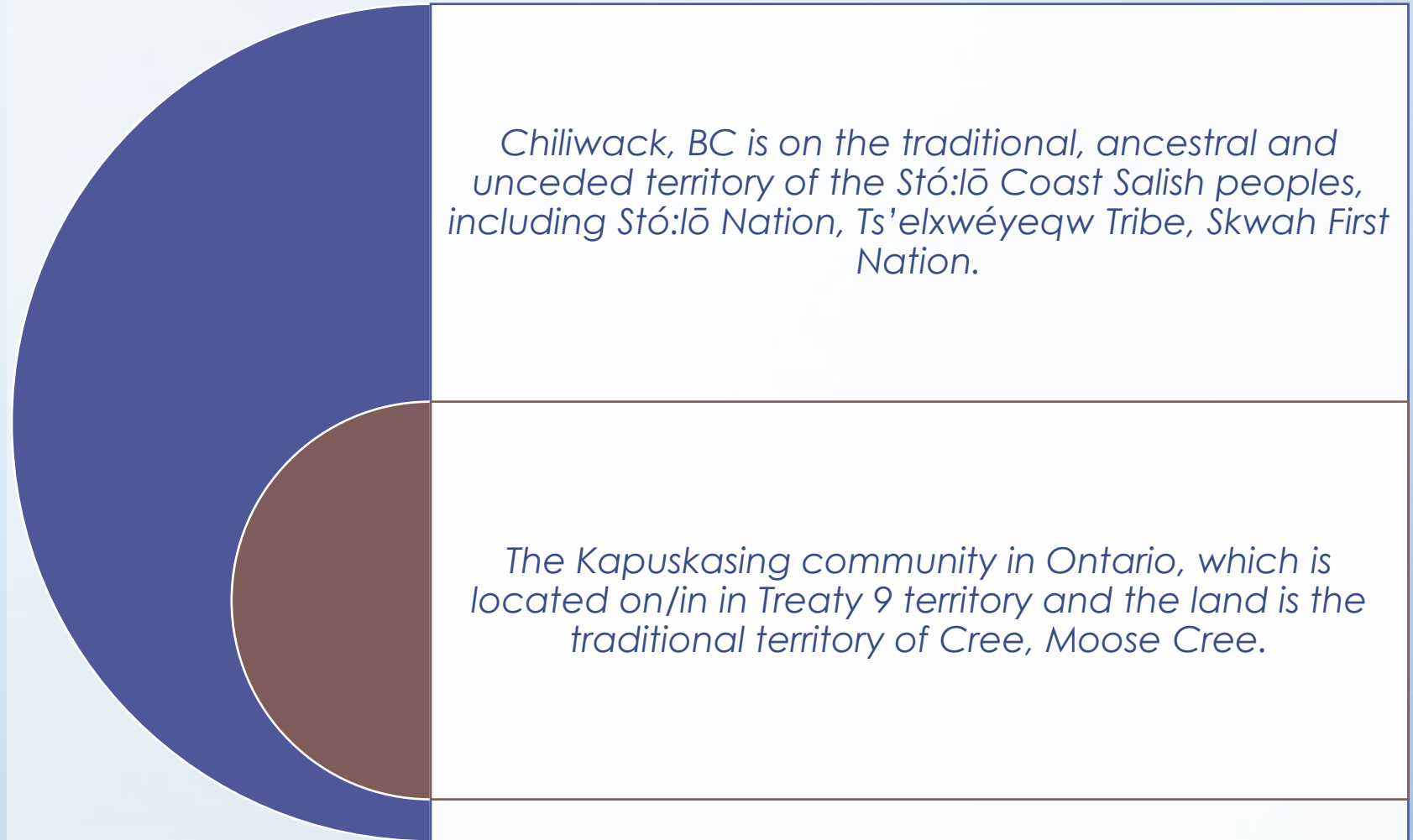EDPS 690: School-based Intervention and Consultation

Shayla Richards, MEd

May 31, 2023

Land Acknowledgement

On this land and in this place we strive to learn together, walk together, and grow together "in a good way."

We are all on land that has been inhabited by indigenous people for thousands of years. Today, our virtual meeting has people in attendance from lands which are still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work, live and play on this land.

The traditional territories of the peoples of Treaty 7, which include the Blackfoot Confederacy, the Tsuut'ina First Nation, and the Stoney Nakoda, and the Métis Nation of Alberta Region 3.

The University of Calgary is situated on land Northwest of where the Bow River meets the Elbow River, a site traditionally known as Moh'kins'tsis to the Blackfoot, Wîchîspa to the Stoney Nakoda, and Guts'ists'i to the Tsuut'ina.

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Chiliwack, BC is on the traditional, ancestral and unceded territory of the Stó:lō Coast Salish peoples, including Stó:lō Nation, Ts'elxwéyeqw Tribe, Skwah First Nation.

The Kapuskasing community in Ontario, which is located on/in in Treaty 9 territory and the land is the traditional territory of Cree, Moose Cree.

Outline

- **SLD-R in Word Reading Accuracy**

  - DSM-5 SLD-R

  - Neurobiology

  - Reading and skill development review

- **Evidence-Based Interventions**

- **Intervention Planning**

  - Problem Identification

  - Goal Identification

  - Intervention Selection

- **Overview of Evidence-Based Interventions (EBIs)**

- **Implications for Practice**

- **Future Research Directions**

- **Summary**

- **Q & A**

Background:
SLD-R in Word Reading Accuracy

Background:
DSM-5 & SLD-R, Word Reading Accuracy

Word Reading Accuracy → Severity

Age of onset → Exclusionary Criteria

(APA, 2013)
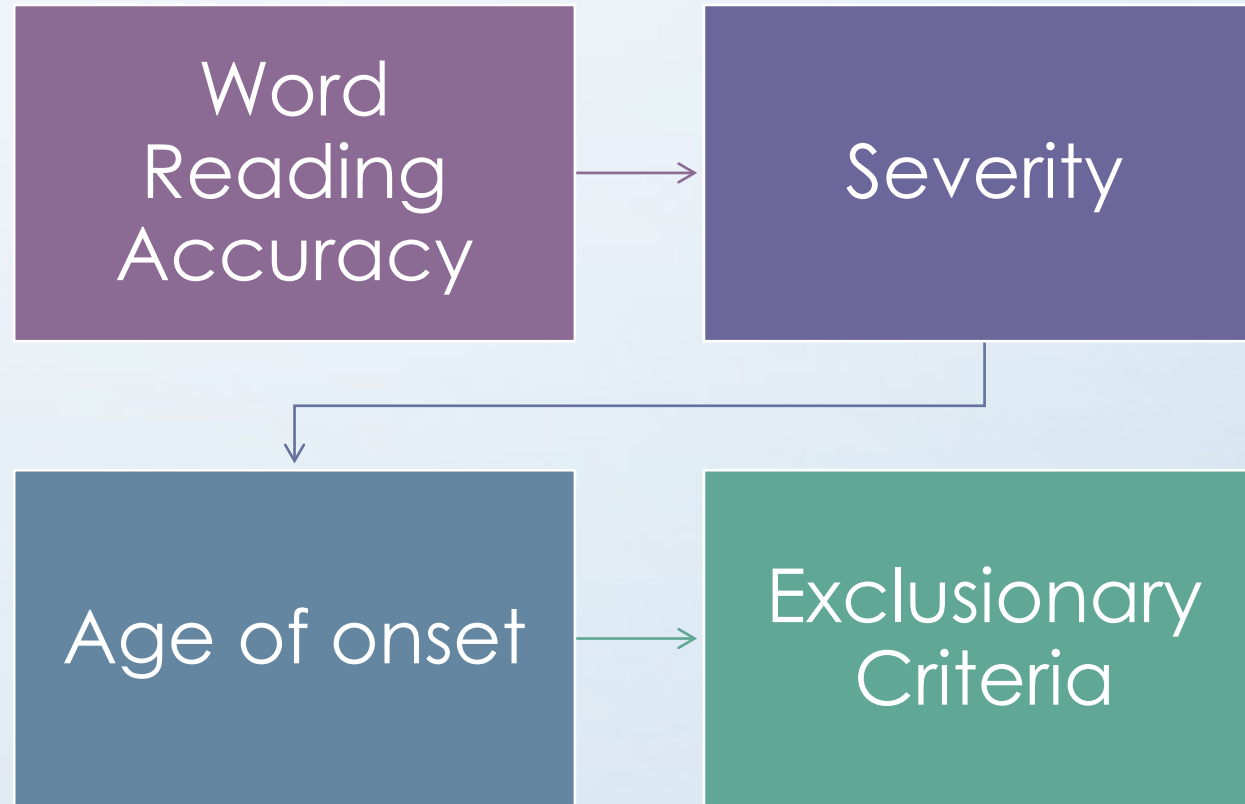
Background:
Neurobiology of SLD-R, Word Reading Accuracy

Brain Language Processing Network

- Atypical connection/connectivity patterns
- Reduced activation
- Phonological processing & orthographic processing

Genetic Factors

- Brain development
- Neuronal migration
- Synaptic plasticity

(Eckert, 2003; Eklund et al., 2013; Gabrieli, 2009; Galaburda et al., 2006; McCrory et al., 2004; Norton & Wolf, 2012; Ramus & Ahissar, 2012; Shaywitz & Shaywitz, 2005)

Background:
Reading and Word Reading Accuracy

Scarborough's Reading Rope

Retrieved from:
https://www.reallygreatreading.com/content/scarboroughs-reading-rope

(Burns, 2021; Pennington et al., 2019)

First step in fluent reading

Word reading accuracy foundational skills

- **Phoneme Processing/Phonics**
  - *Teaching relationship between letters, letter combinations, and individual sounds*
  - *Mapping sounds onto symbols*
  - *Interchangeable terms include sound-symbol association, phoneme-grapheme correspondence, the alphabetic principle*
- **Phonemic Awareness**
  - *Ability to hear and manipulate individual phonemes*
  - *The last of the phonological awareness skills to develop*
  - *Awareness of sounds only, no letters are introduced*
- **Decoding**

Review:
Formal Diagnosis of SLD-R, Word Reading Accuracy

1 Initial Screening	2 Referral for Assessment	3 Comprehensive Assessment	4 Data Analysis and Diagnosis	5 Documentation and Reporting

(APA, 2013; CPA, 2021; CPA, n.d.; LDAC, 2021)

Background:
Evidence Based Interventions

Background: Evidence-Based Interventions

Why?

Every Child Succeeds ACT (ESSA), USA

- EBIs are mandated in schools

Moore V. BC

Right to Read

School Psychologists and EBIs

- Evidence-based strategies at classroom and building levels
- Evidence based Intervention Planning Practices

What?

"Strategies, practices, and programs with available research documenting their effectiveness and data suggesting that they are enhancing student outcomes"

(Burns et al., 2017, p. 4)

(Burns et al., 2017; OHRC, 2022)

Review:
EBIs & Evidence Based Frameworks

Response to Intervention (RTI)
- Multi-tiered
- Universal (Tier 1), Tier 2, Tier 3
- Responses at each level determines next steps

Skill by Treatment Interaction (STI)
- Identify environmental conditions most connected to the problem
- Skill deficit isolation
- Manipulates conditions to match them to student needs

Learning Hierarchy
- Link between instruction and student skills
- Optimal instructional level helps inform intervention selection
- Students learn best at optimal level
- acquisition, fluency building, generalization, and adaptation

Curriculum-based assessment for instructional design (CBA-ID)
- Relies on accuracy and rate data
- Interventions drawn from comparisons to instructional-level criteria

(Burns, 2021; Burns et al.,2010; Parker & Burns, 2014)

Intervention Planning

Key Areas for Intervention Planning

Problem Analysis

- Problem Identification
- Goal Identification
- Goal Formulation
- Intervention Targets

Intervention Selection

- Multi-tiered differences
- Instructional hierarchy
- EBI

Evaluate Effectiveness

- Evidence-based screening and progress monitoring

Modify as Needed

- Make changes to the problem, intervention target, and intervention as needed.

(Burns et al., 2017; Moore et al., 2017; Pennington et al., 2019)

Problem Identification:
How do we know Student needs this Intervention?

Curriculum Based Assessment Instructional Design (CBA-ID)

Response to Tier Intervention

Screening and Assessment Data

Pre-Intervention Data

(Burns et al., 2017)

Problem Identification:
Data Collection

- Screeners
  - DIBELS (Dynamic Indicators of Basic Early Literacy Skills)
  - TPRI (Texas Primary Reading Inventory)
  - AIMSweb
  - PALS (Phonological Awareness Literacy Screening)
  - EasyCBM

(Burns et al., 2010, Burns et al., 2017; Parker & Burns, 2014)
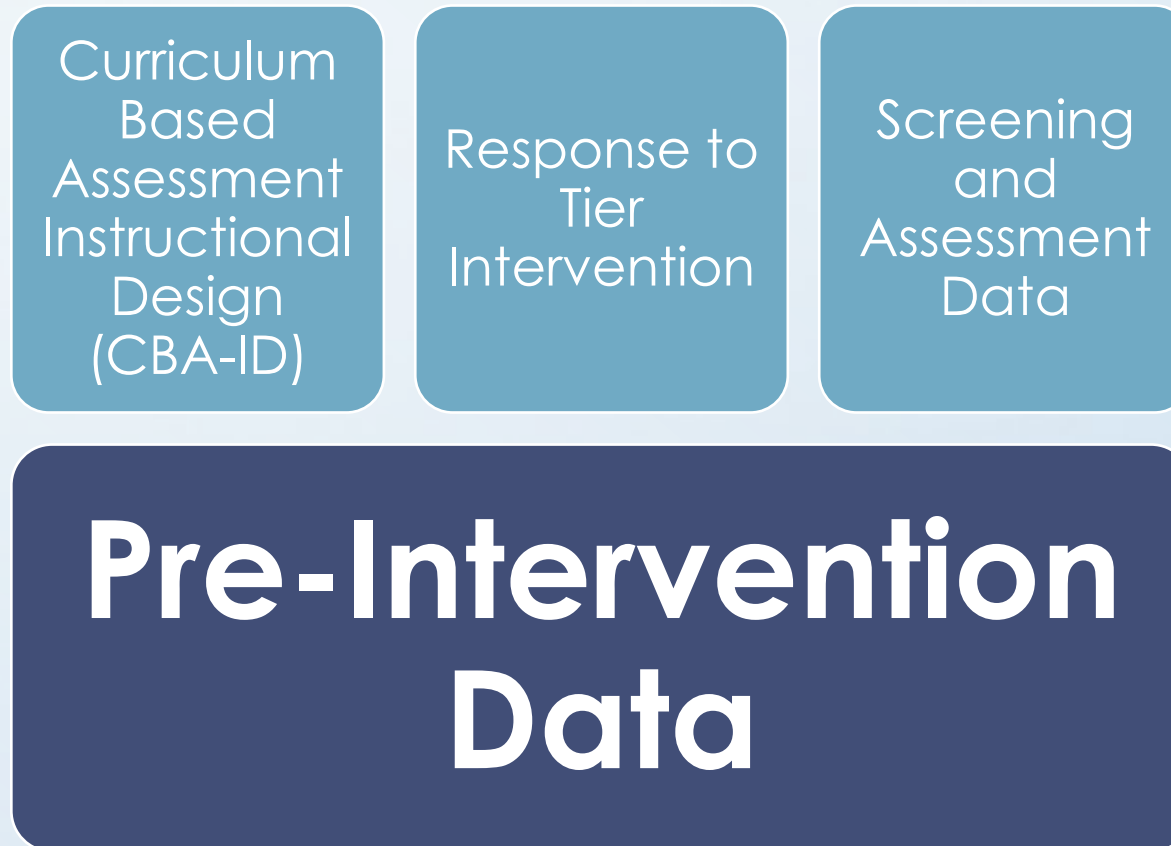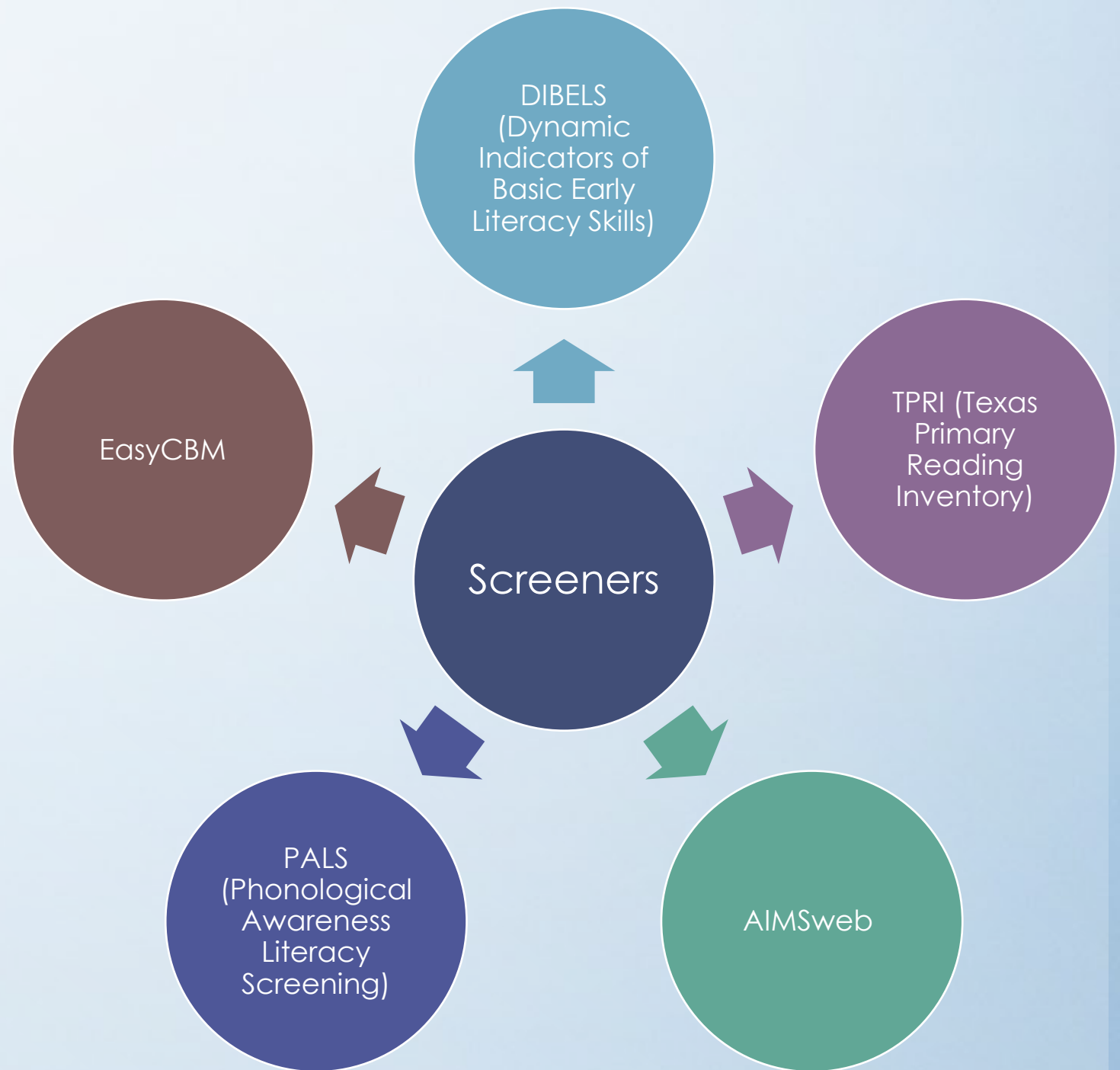
Problem Identification:
Data Collection

Response to Intervention (RTI)

Universal Screening (Tier 1)	Progress Monitoring (Tier 2 and Tier 3)	Decision-Making for Interventions (Tier 2 and Tier 3)

Identify students who may be at risk for reading difficulties, including word reading accuracy problems.	Screeners, such as DIBELS, TPRI, or AIMSweb,	To track growth and intervention effectiveness of interventions.	Screeners like DIBELS or EasyCBM can be used periodically to assess students' fluency and accuracy in word reading.	The data from screeners and progress monitoring	decision-making for interventions.	Indicate who requires targeted interventions at Tier 2.	Those who require more intensive support may be referred to Tier 3.

(Burns et al., 2010; Burns et al., 2017; Parker & Burns, 2014)

Goal Identification:
How Does that Guide Us?
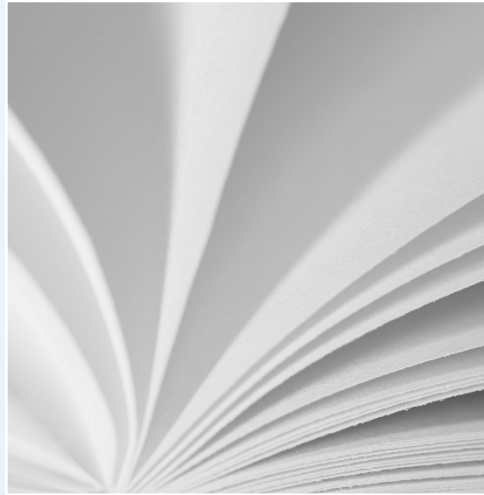
Goals can be identified analysing various data sources:

Universal Screening; Response to Intervention (RTI); Skill by Treatment (STI) Interaction; Curriculum Based Assessment for Instructional Design (CBA-ID)

How does that guide us?

- Competency enhancing
- Intervention targets based on preintervention data
- Environmental variables
- Instructional level

(Burns et al., 2017; Burns et al., 2022)

Goal Identification:
Response to Intervention

"Is there a Classwide need?"

- Tier 1
- Are difficulties result of systemic issues that respond to instruction changes?

"What is the category of the problem?"

- Tier 2
- Broad area of deficit individual students
- Word Reading accuracy?
- Students grouped together for interventions based on their individual data

"What is the causal/functional variable?"

- Tier 3
- Examine variables such as using more errorless and salient stimuli to support initial acquisition, increased repetition to support retention, and others, and they are
- May be identified through brief experimental analysis (BEA) of student behavior

(Burns et al., 2017)

Goal Identification:
Learning Hierarchy & Instructional Level

- Acquisition Phase
  - Low Accuracy and Slow
- Target:
  - 90% vs 93%
- Enhance accuracy:
  - Modeling
  - Explicit Instruction
  - Immediate Feedback

	ACQUISITION	FLUENCY BUILDING	GENERALIZATION	ADAPTATION
Student Performance	Low accuracy (e.g., <90% for most facts or<93% for text reading) and slow (e.g., below published CBM benchmark criterion)	Accurate (e.g.,>90% for most facts or>93% for text reading) but slow (e.g., below published CBM benchmark criterion)	Accurate (e.g.,>90% for most facts or>93% for text reading) and fast (e.g., above published CBM benchmark criterion)	Can generalize the skill (e.g., reads previously taught sounds or words correctly in connected text)
Instructional Priority	Build Accuracy: • Modeling • Explicit instruction • Immediate feedback	Build Speed: • Practice • Increased repetition • Delayed feedback	Build Application: • Guided application of skills • Opportunities to use skills in different contexts	Build Problem Solving: • Applying skills in different situations • Applying skills in simulations to solve problems

Phases of the learning hierarchy and instructional priority. Retrieved from https://www.researchgate.net/profile/Matthew-Burns -10/publication/356811279_Intensifying_Reading_Interventions_Through_a_Skill-By-_Treatment_Interaction_What_to_Do_When_Nothing_Else_Worked_Learning_Hierarchy/links/61ae26e8ca2d401f27cdbac4/Intensifying-Reading-Interventions-Through-a-Skill-By-Treatment-Interaction-What-to-Do-When-Nothing-Else-Worked-Learning-Hierarchy.pdf

(Burns et al., 2017; Burns, 2021; Burns et al., 2022)

Goal Identification: STI & Instructional Level

Tom,
Grade 2

Assess.
DIBELS 8

37 CLSM
on NWF

5 Errors

88%
accuracy

T vs. Benchmarks

- T < 93% Accuracy
- T < 50 50 CLSM

Acquisition Phase

- Modelling
- Corrective Feedback

(Burns et al., 2017; Burns, 2021; Burns et al., 2022)
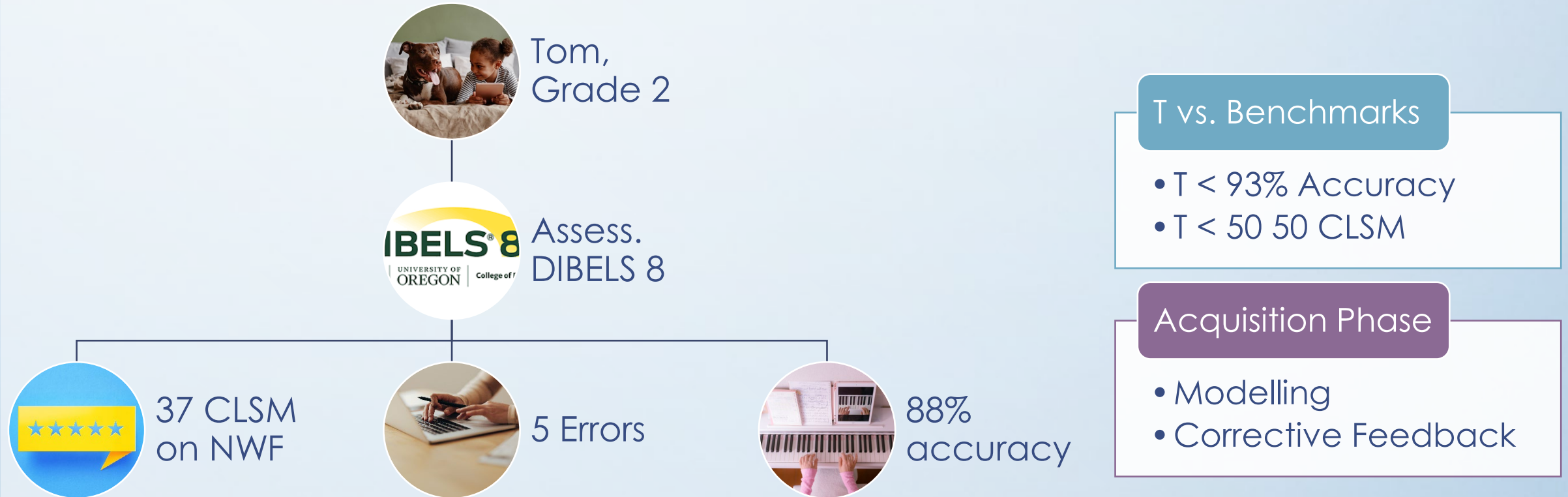
Goal Identification: Instructional Level & Hypothesis Development

Can Student Complete the task they just learned?

Yes

No

Can they complete it the next day?

Yes

No

Acquisition Phase

Can they apply it?

Fluency-Phase

Yes

No

Generalization Phase

(Burns, 2021)
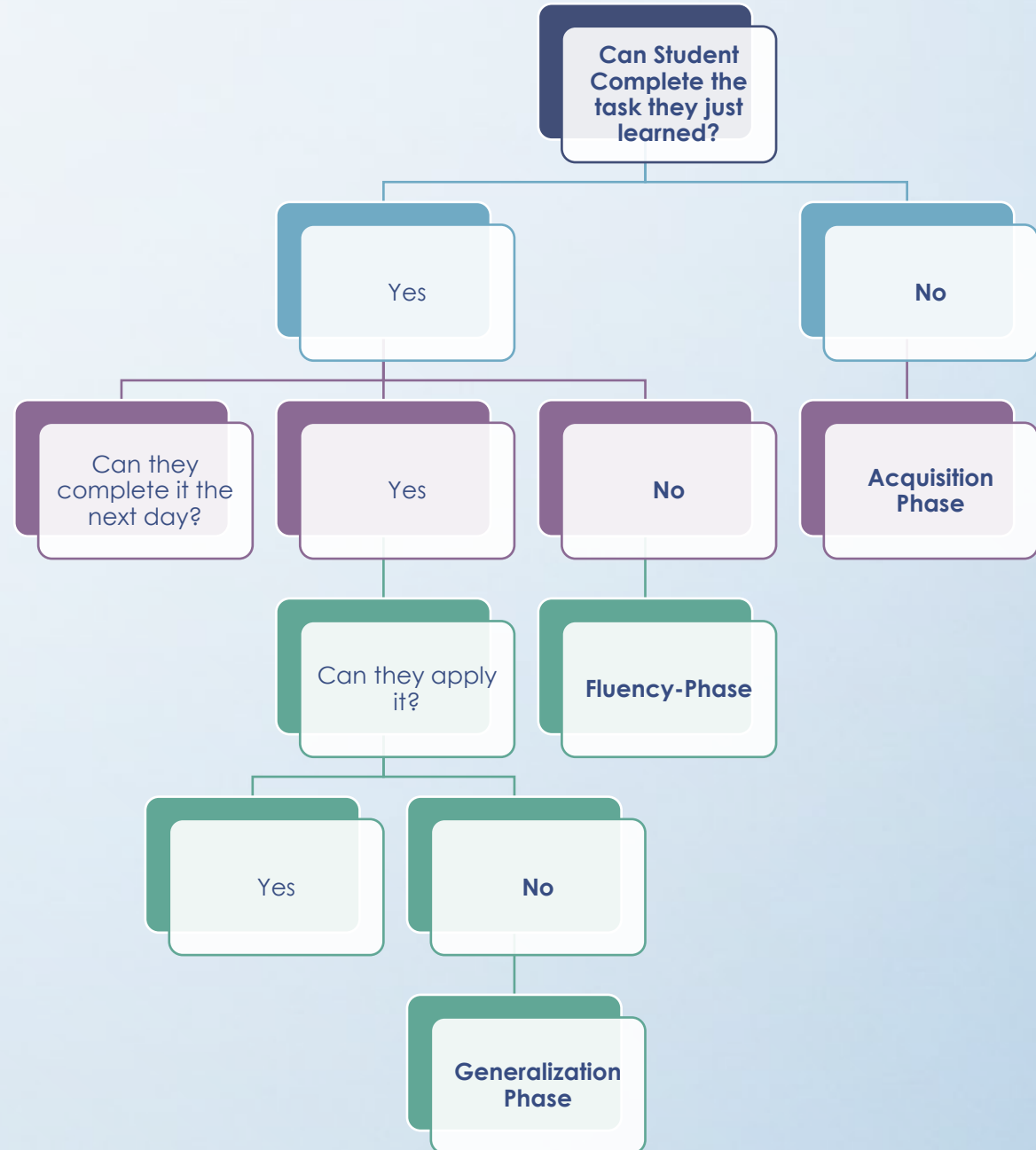
Intervention Planning: Intervention Selection

What makes a good Intervention?

Documented Evidence of Effectiveness

Consistent with ecological Perspective

Can be evaluated by reliable, valid and practical methoda

Can be Implemented using typical classroom resources

Alignment with Function of the Problem (Causal Variable)

Easily Taught through Consultation Method

Proactive Approach

Can be implemented Classwide

(Burns et al., 2017)

Evidence Based Instruction & Intervention

Brief Literature Review
Exploring the Evidence: Early Literacy Research

Promoting Early Literacy Skills	Effective Instruction in Decoding and Phonics	Building Word Reading Accuracy
• Early, consistent exposure to books impacts positively • Intentional classroom activities boost oral language growth • Increased print awareness aids early literacy development	• Explicit, systematic instruction crucial for at-risk students • Regular phonics instruction from kindergarten or first grade • Effective phonics instruction must include phoneme-grapheme connections and application to reading and spelling tasks	• Screening tools identify student strengths, areas for support • Systematic phonics instruction, integration into meaningful reading, spelling tasks is vital • Early phonemic awareness training enhances reading, spelling skills
(Hume et al., 2016; Pullen & Justice, 2003)	(Buckingham et al., 2019; Al Otaiba et al., 2012; Ehri et al., 2001; Hall et al., 2022; Torgesen and Hudson, 2006)	(Al Otaiba et al., 2012; Ehri et al., 2001; Hosp et al., 2016; Hudson et al., 2005; Melby-Lervåg et al., 2012; NRP, 2000; Torgesen, 1999; Torgesen and Hudson, 2006)

Evidence Based Interventions:
Instructional Hierarchy and Interventions

Word Reading Accuracy

Listening Passage Preview

Phase Drill Error Correction

Adequate decoding but make frequent errors

Mostly accurate (93-97%) but slow readers

Modelling (acquisition)

Modelling (Acquisition)
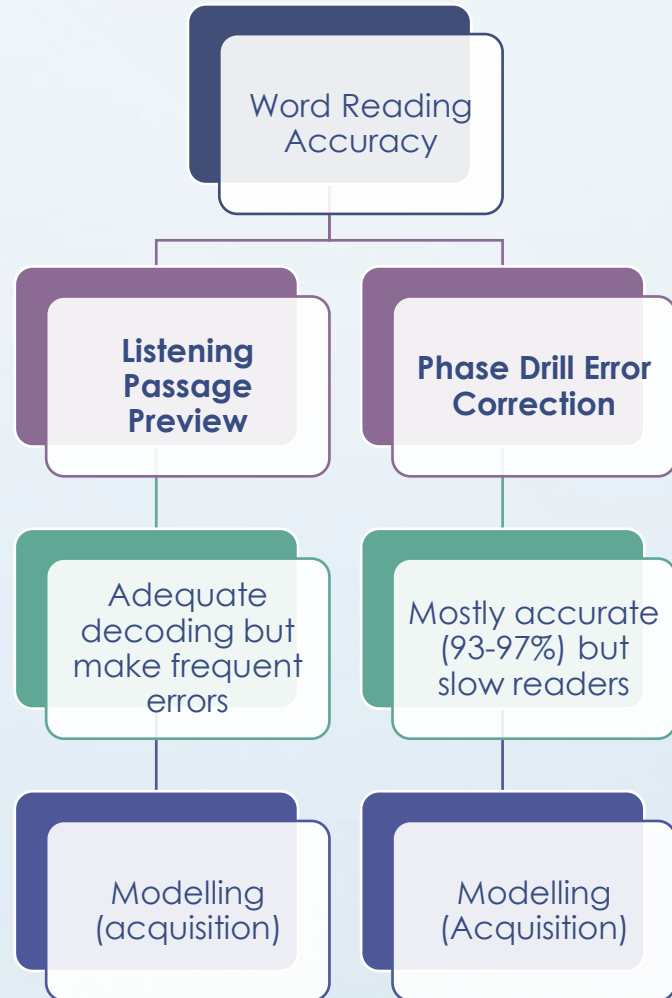
Considerable evidence:

– Burns, Codding, Boice, & Lukito, (2010)

– Chafouleas, Martens, Dobson, Weinstein, & Gardner (2004)

– Szadokierski et al., 2017

– Supports intervention matching to instructional hierarchy

– Supports RTI as preintervention measures predicted the outcome

Research Supports Matching Interventions to Instructional Phase

– Acquisition phase (slow and inaccurate) respond to modeling and error correction,

– Students in Fluency phase (accurate and slow) responded best to repetition and practice

Acquisition

– Listening Passage Preview and Phase Drill Error (modelling to increase accuracy)

(Burns et al., 2017)

Program	Target	Focus Areas	Tier	Notes
SRA Open Court Reading	K-5	Word-reading accuracy and fluency	Tier 1	Differentiated instruction for ELL and slower progressing students
Wilson Fundations®	K-3	Phonemic awareness, word study, spelling, vocabulary, oral language, reading comprehension	Tier 2	Suitable for struggling students
Firm Foundations	PreK-3	Vocabulary, rhyme/syllable detection, phoneme detection/segmentation	N/A	Play-based, multilingual, diverse socio-economic backgrounds
Remediation Plus Systems	K-12	Explicit phonics instruction, decoding, spelling	Tier 2	Canadian intervention
SRA Early Interventions	K-3	Foundational word-reading skills	N/A	Supplement to core reading programs, for intensive early intervention
Empower™ Reading	Gr 2-8	Spelling, Decoding	N/A	Direct, explicit instruction with metacognitive strategy instruction
SRA Reading Mastery and Corrective Reading	K-6	Reading difficulties	Tiers 2/3	Systematic reading skills instruction across five critical strands
SpellRead™	Gr 1-12	Sound-letter mapping, decoding accuracy, reading multisyllabic words	N/A	Targets word-reading difficulties

(Ontario Human Rights Commission, 2022)

Program	Target	Focus Areas	Tier	Notes
Wilson Just Words®	N/A	Word-reading difficulties	Tier 2	For children with disabilities or dyslexia
Wilson Reading System® 4th Edition	N/A	Intensive reading intervention	Tier 3	For students not making progress in other interventions
Lindamood Phoneme Sequencing® (LiPS®)	K-3	Decoding words	Tier 3	For students with persistent difficulties with phoneme-level awareness
ABRACADABRA	PreK-3	Phonemic awareness, phonics, word-reading skills	N/A	Canadian online program, regular use enhances reading skills
Fast ForWord	K-8	Phonological awareness, phonics, fluency, vocabulary, comprehension	Tiers 2/3	Also strengthens cognitive skills, effective when used consistently/intensively
Read Naturally	K-8	Teacher modeling, repeated reading, progress monitoring	N/A	Can significantly improve reading skills
i-Ready	K-12	Phonological awareness, phonics, fluency, vocabulary, comprehension	N/A	Individualized instruction, effective when used consistently and under teacher guidance
PlayRoly	3-5	Phonological awareness skills, rhyme recognition, syllable segmentation, initial sound recognition	N/A	Combines entertainment with education to enhance motivation to learn

(Ontario Human Rights Commission, 2022)

Meta-analysis: effective treatment approaches (example)

Table 2. Efficacy of treatment approaches on reading and spelling outcomes.

Treatment approach	Outcome	g', 95% CI		SE	p	I^2	n/k
Phonics	Spelling	0.68,	[0.15, 1.21]	0.23	.017	86%	10/14
	Reading	0.62,	[0.37, 0.86]	0.10	<.001	67%	10/44
Morphological intervention	Spelling	0.80,	[0.39, 1.20]	0.21	<.001	51%	8/8
	Reading	0.30,	[−0.18, 0.77]	0.16	.150	27%	5/10
Orthographic intervention	Spelling	0.67,	[0.05, 1.28]	0.31	.034	83%	6/6
	Reading	0.19,	[0.09, 0.29]	0.02	.014	0%	4/12
Memorization intervention	Spelling	0.22,	[−0.39, 0.82]	0.31	.484	0%	2/2
Supportive software	Spelling	1.25,	[0.83, 1.66]	0.21	<.001	0%	2/2
	Reading	0.52,	[−5.1, 6.14]	0.44	.449	77%	2/3

Note. CI = confidence interval; n = number of experimental and control group comparisons; k = number of outcomes.

(Galuschka et al., 2020, p. 11)

statisticshowto.com/hedge...

Apps | Rea

Rule of Thumb Interpretation

Cohen's d and Hedges' g are interpreted in a similar way. Cohen suggested using the following **rule of thumb** for interpreting results:

- Small effect (cannot be discerned by the naked eye) = 0.2
- Medium Effect = 0.5
- Large Effect (can be seen by the naked eye) = 0.8

Beyond the Package
Evaluating the Effectiveness of Reading Interventions

- Examine packaged solutions
  - are skill by treatment interactions considered?

- Look beyond packaged solutions
  - is it in the child's best interest?

- Ensure comprehensive assessment
  - are all components of reading addressed?

- Examine foundational reading components
  - phonological processing, phonemic awareness, sound-symbol association

- Examine individual needs
  - phonics, sight-word recognition issues?

- Identify core deficits
  - is the intervention really tailored to the student?

- Other variables (i.e. SES, absenteeism)
  - how is it impacting learning gaps?

- Critically evaluate evidence
  - effect sizes, third-party studies - are they there?
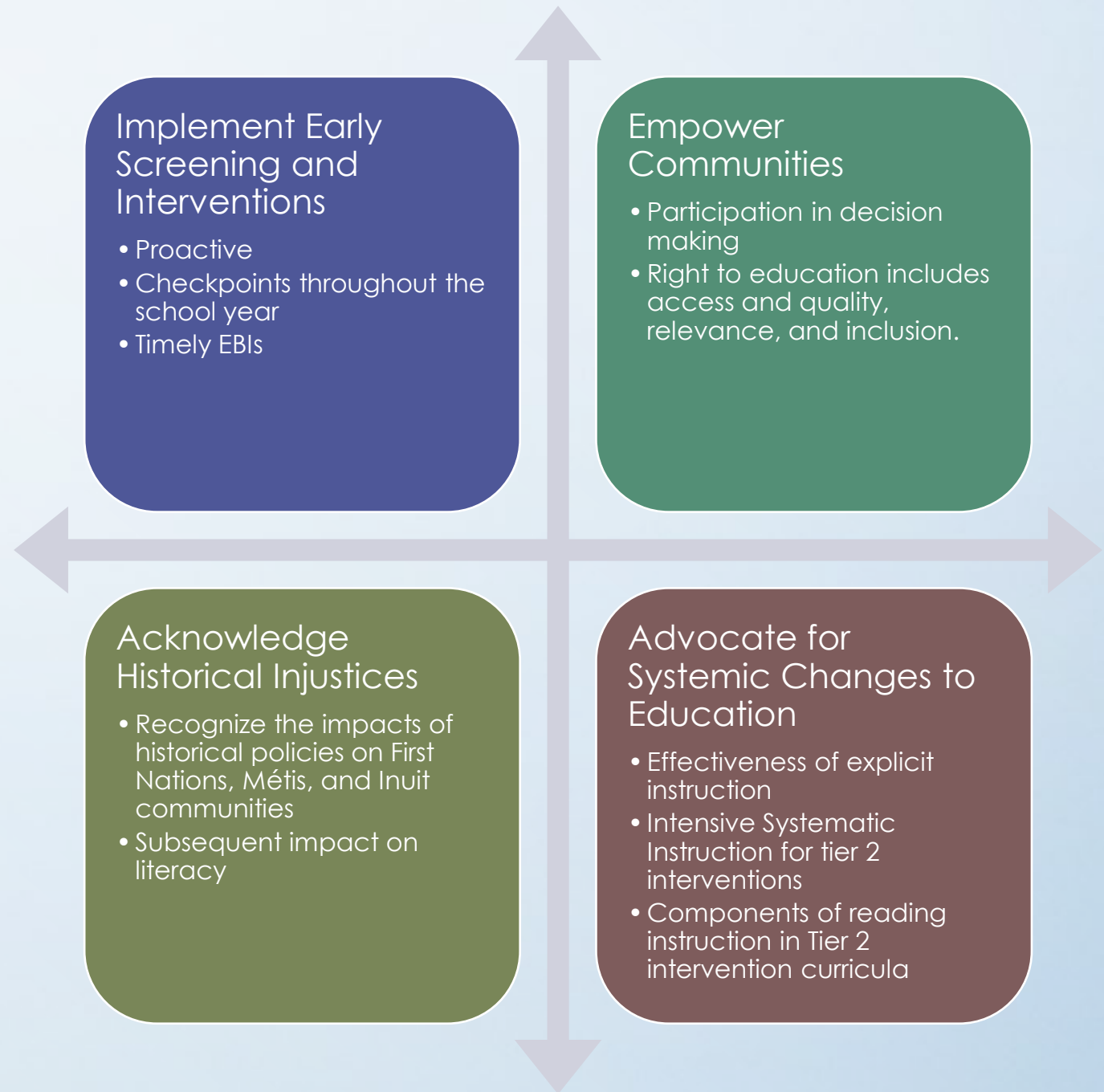
Close.

Moving onto Q & A...

Q & A

- Considering our presentation and your own experience, what concerns related to reading development or SLD-R have you experienced? What challenges did you face?

- What concerns related to consultation and literacy do you foresee arising in your practice, and anything you will take away from our presentation?

- How prepared do you feel to take the lead an assessment and intervention plan related to SLD-R? What areas of growth do you see for yourself to prepare moving into our internships?

(Understood, 2016)

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