

Building Statistical Understanding to Support Organizational Data Culture

Karin Neff, Ph.D. – Bozeman Public Schools Bozeman, MT

Bozeman Public Schools (BSD7) is a 7000-student public school district in central Montana. Since 2016, they have prioritized establishing a data culture to better support teachers and maximize student success.

BSD7 data goals:

- Establish organizational engagement with data to cement a shared sense of purpose
- Use data to support instructional practices and student success

Barriers to using data:

- Fear of how data will be used
- Statistical knowledge gaps
- Time constraints

Requirements for success:

- Visual
- Intuitive
- Actionable
- Contextual
- Transparent

Strategies for increasing data use and understanding:

- Shared vocabulary around data
- Show longitudinal trends, patterns, and distributions
- Effective and engaging data visualization
- Increase opportunities to have data-driven conversations
- Find balance between delivering conclusions and guiding interpretation by users
- Allow feedback, research suggestions and observations from all users

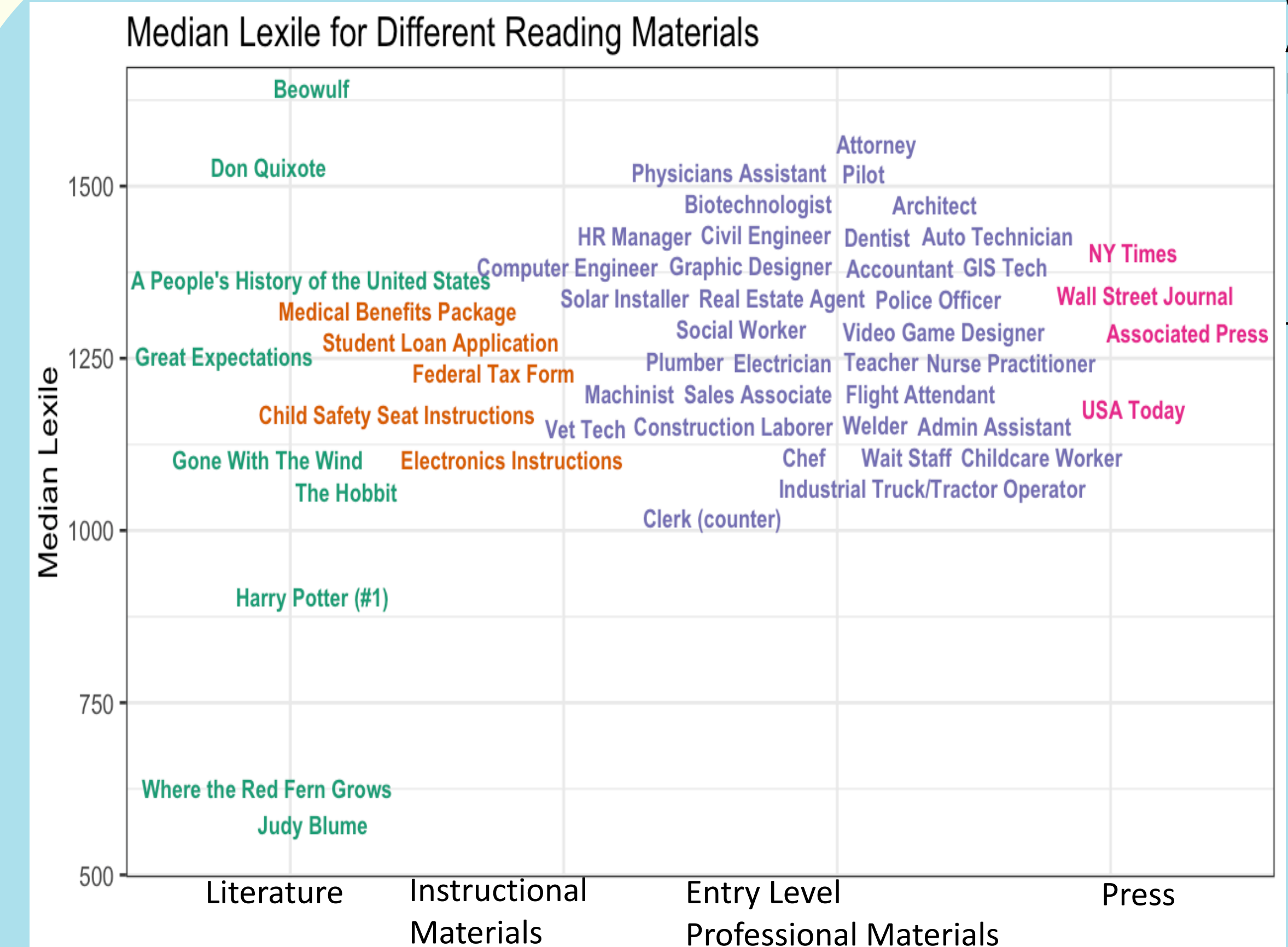
Case Study: Bozeman High School (BHS) student literacy proficiency, as measured by the STAR Reading assessment, has been around 50% for 9th and 10th graders since 2015. Staff focused on improving literacy proficiency during the 2017-18 and 2018-19 school years.

- Staff meetings centered around using data
- Opportunity to use data in creative ways to engage teachers

Case Study Results:

Literacy proficiency improved for cohorts by

- 4% from Spring 2017 to Spring 2018
- 7% from Spring 2018 to Spring 2019



Provide Context

Lexile® measures reading comprehension at different levels of text complexity. Student assessment scores were plotted on this scale to help teachers contextual student abilities relative to requirements for navigating the post-secondary world.

Median 10th Grade Assessment Benchmarks

Proficient

Tier I – nearing proficiency

Tier II

Tier III



teacher_name	course_name	period	grade_level	student_last	student_first	percentile_rank
Chemistry	1(A)	11	11			99
Chemistry	1(A)	11	11			98
Chemistry	1(A)	11	11			98
Chemistry	1(A)	11	11			95
Chemistry	1(A)	11	11			92
Chemistry	1(A)	11	11			92
Chemistry	1(A)	11	11			88
Chemistry	1(A)	11	11			78
Chemistry	1(A)	11	11			78
Chemistry	1(A)	11	11			75
Chemistry	1(A)	11	11			75
Chemistry	1(A)	11	11			74
Chemistry	1(A)	11	11			73
Chemistry	1(A)	11	11			68
Chemistry	1(A)	11	11			61
Chemistry	1(A)	11	11			60
Chemistry	1(A)	11	11			58
Chemistry	1(A)	11	11			54
Chemistry	1(A)	11	11			54
Chemistry	1(A)	11	11			53
Chemistry	1(A)	11	11			25

teacher_name	course_name	period	grade_level	student_last	student_first	percentile_rank
Chemistry	2(A)	11	11			98
Chemistry	2(A)	11	11			89
Chemistry	2(A)	11	11			86
Chemistry	2(A)	11	11			83
Chemistry	2(A)	11	11			78
Chemistry	2(A)	11	11			77
Chemistry	2(A)	11	11			64
Chemistry	2(A)	11	11			64
Chemistry	2(A)	11	11			63
Chemistry	2(A)	11	11			62
Chemistry	2(A)	11	11			60
Chemistry	2(A)	11	11			56
Chemistry	2(A)	11	11			56
Chemistry	2(A)	11	11			56
Chemistry	2(A)	11	11			54
Chemistry	2(A)	11	11			54
Chemistry	2(A)	11	11			48
Chemistry	2(A)	11	11			47
Chemistry	2(A)	11	11			46
Chemistry	2(A)	11	11			41
Chemistry	2(A)	11	11			39
Chemistry	2(A)	11	11			33
Chemistry	2(A)	11	11			24
Chemistry	2(A)	11	11			20

Visualize Data

- The entire high school staff was presented with infographics illustrating the state of literacy proficiency for 9th and 10th graders
- Every teacher was given student-specific literacy data for each of their periods, allowing them to see the variability in scores and gain understanding in what barriers might be preventing students from being successful in their classes.

Conclusions:

- Presenting data in creative and visual ways increases positive engagement
- Shared vocabulary helps remove misconceptions and increases understanding
- Transparency is critical for removing trepidation around using data
 - Be clear on data-use goals and priorities
 - Allow open communication for sharing research suggestions, questions and insights from all users