

If You Are Waiting For AI To Mature, You Are 20 Years Too Late

Paul Edelblut



About the presenter

- Paul Edelblut, Vice President Cognitive Computing
- Vantage Laboratories
- Vantage is a global technology holding company based in the USA with operations around the world. With more than 2 billion daily users of our linguistic, cognitive computing and artificial intelligence technologies we support a wide range of customers in many industries, education, and government.

A Glimpse at the Past in Education.....

- “Students today depend upon paper too much. They don’t know how to write on slate without chalk dust all over themselves. They can’t clean a slate properly. What will they do when they run out of paper?
~Principals Association, 1815
- “Students today depend too much upon ink. They don’t know how to use a pocketknife to sharpen a pencil. Pen and ink will never replace the pencil.”
~National Association of Teachers, 1907
- “Students today depend upon store-bought ink. They don’t know how to make their own. When they run out of ink, they will be unable to write words or ciphers until their next trip to the settlement. This is a sad commentary on modern education.” ~Rural American Teacher, 1929

A Glimpse at the Past in Education.....

- “Students today depend upon these expensive fountain pens. They can no longer write with a straight pen and nib (not to mention sharpen their own quills). We parents must not allow them to wallow in such luxuries”

~PTA Gazette, 1941

- “Ballpoint pens will be the ruin of education in our country. Students use these devices and then throw them away. The American virtues of thrift and frugality are being discarded.”

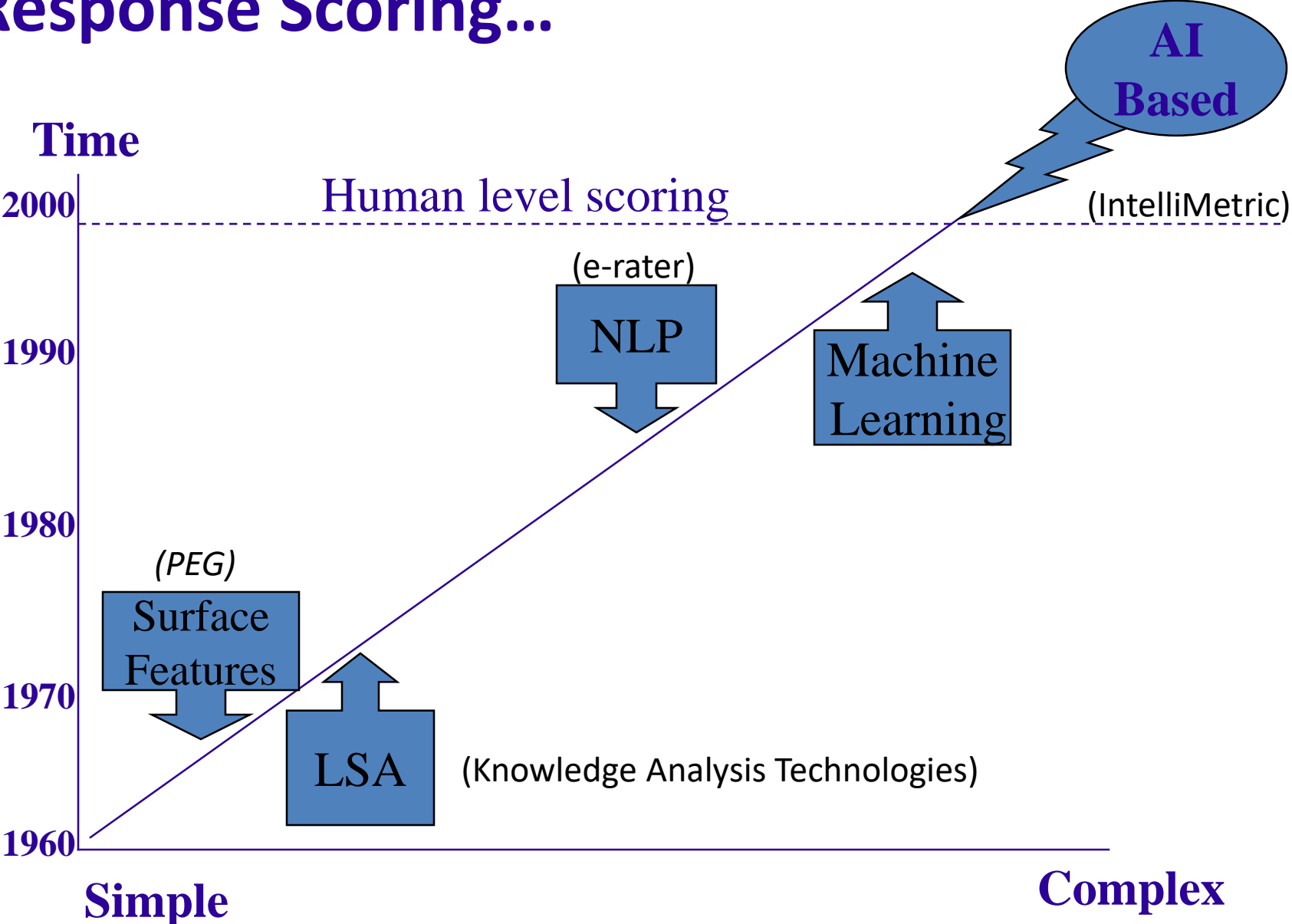
~Federal Teacher, 1950

- “Students today depend too much on handheld calculators.”
~National Teachers Conference, 1984

Early Innovations

- “These automobiles are far too difficult to operate. One must manipulate the hands to shift gears and control direction while simultaneously using the feet to accelerate and stop. This will lead to disastrous injuries that far exceed the benefits of efficiency.
~US Congressman, 1908
- “We see no commercial use for this device.”
~Western Electric Memo Referring to the Telephone, 1876
- “Why would anyone want a computer in their home?.”
~IBM Executive Responding to the Idea of Personal Computers, 1980
- “Computers can’t score a constructed response item!”
~Someone in this room?

Brief History of AI in Constructed Response Scoring...



Understanding AI by understanding the Organic Brain

The Many Strands that are Woven into Skilled Reading
(Scarborough, 2001)

LANGUAGE COMPREHENSION

BACKGROUND KNOWLEDGE
(facts, concepts, etc.)

VOCABULARY
(breadth, precision, links, etc.)

LANGUAGE STRUCTURES
(syntax, semantics, etc.)

VERBAL REASONING
(inference, metaphor, etc.)

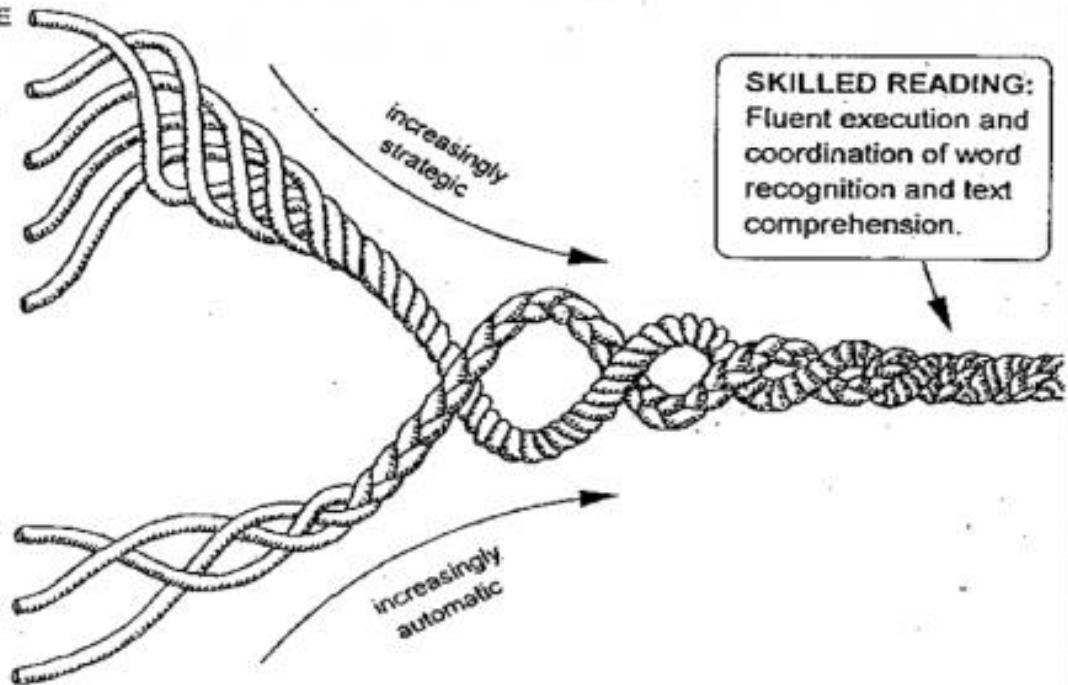
LITERACY KNOWLEDGE
(print concepts, genres, etc.)

WORD RECOGNITION

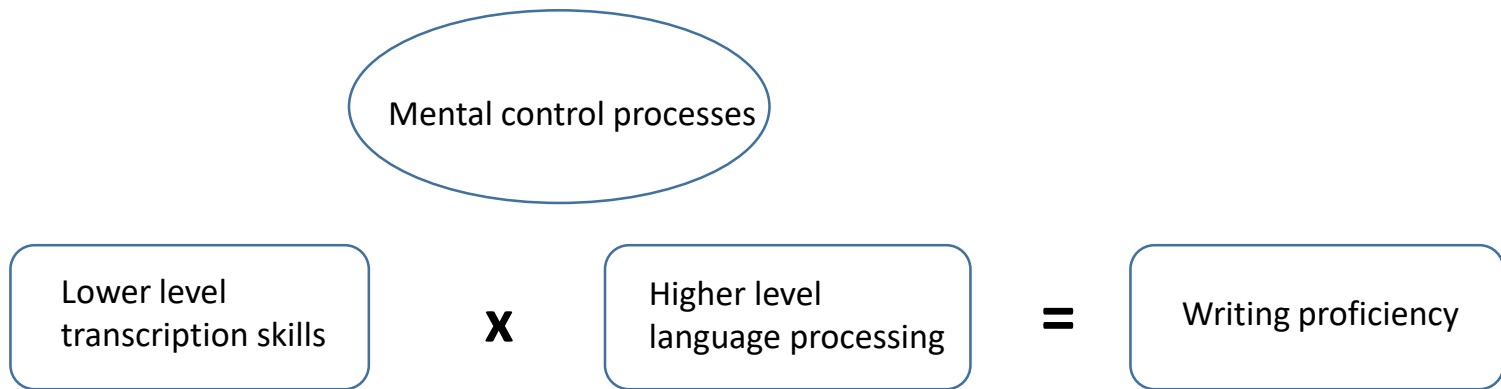
PHONOLOGICAL AWARENESS
(syllables, phonemes, etc.)

DECODING (alphabetic principle,
spelling-sound correspondences)

SIGHT RECOGNITION
(of familiar words)

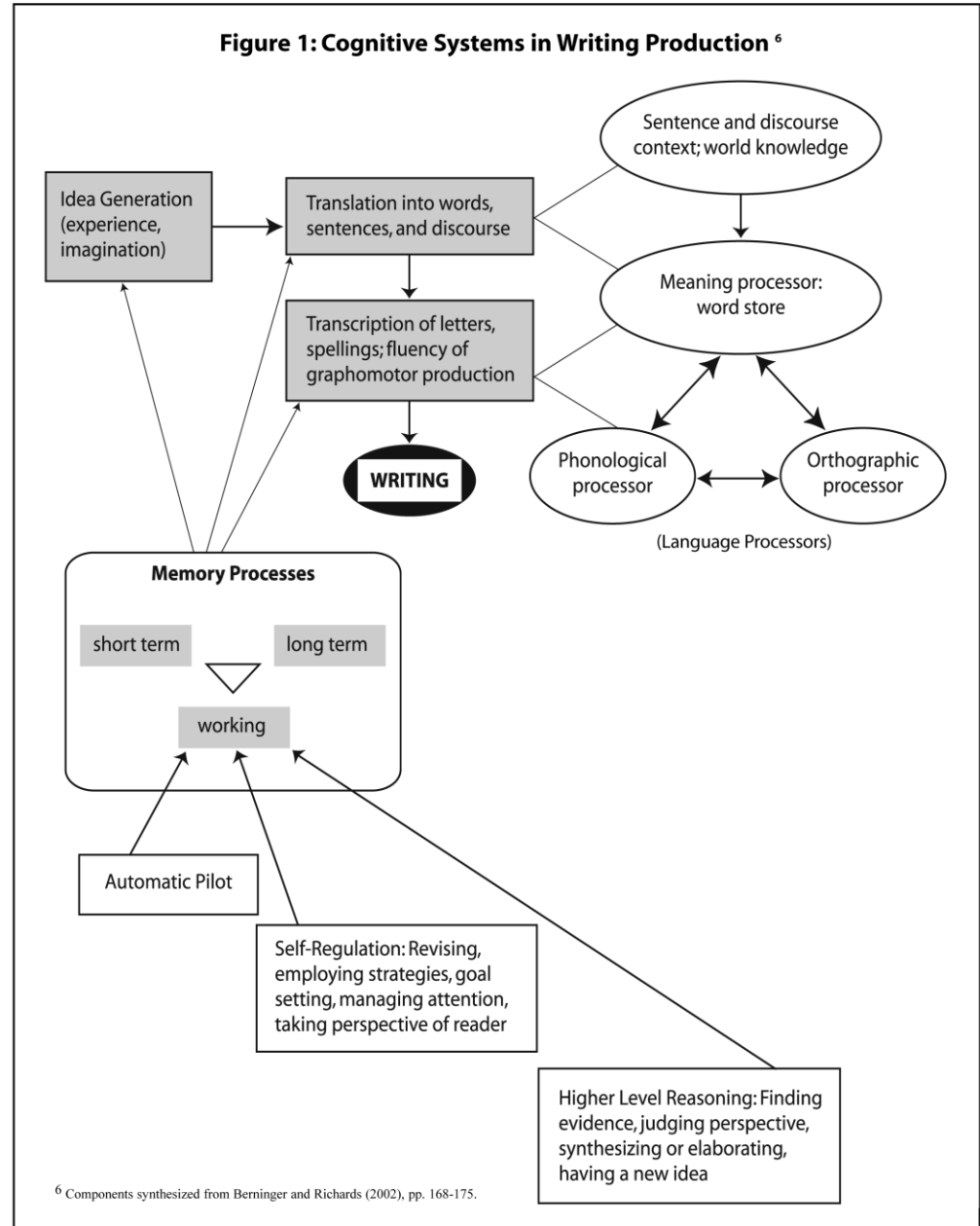


Understanding What We Are Scoring with Humans or Machines: A Simple View of Writing



Cognitive Systems in Writing Production

Figure 1: Cognitive Systems in Writing Production⁶

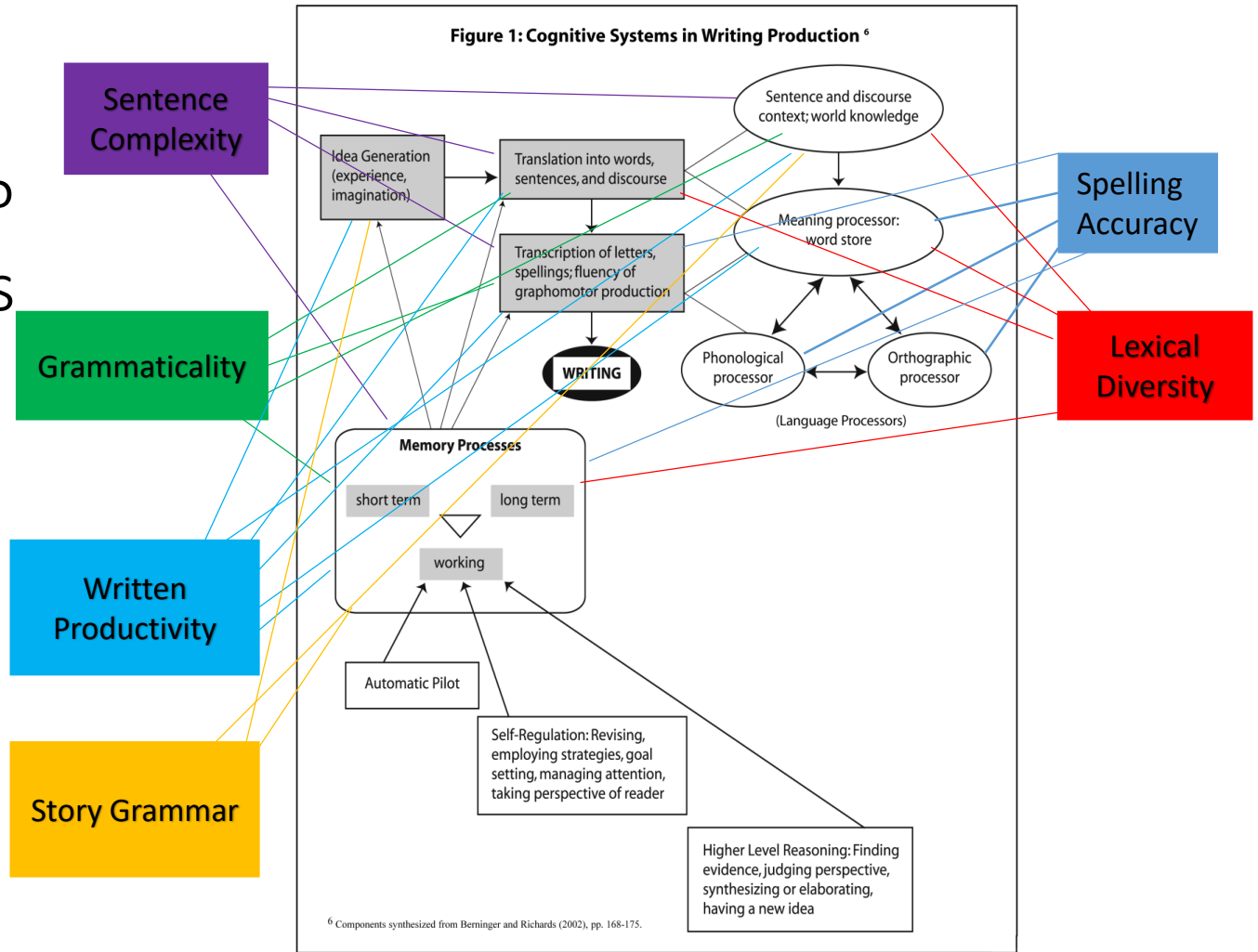


⁶ Components synthesized from Berninger and Richards (2002), pp. 168-175.

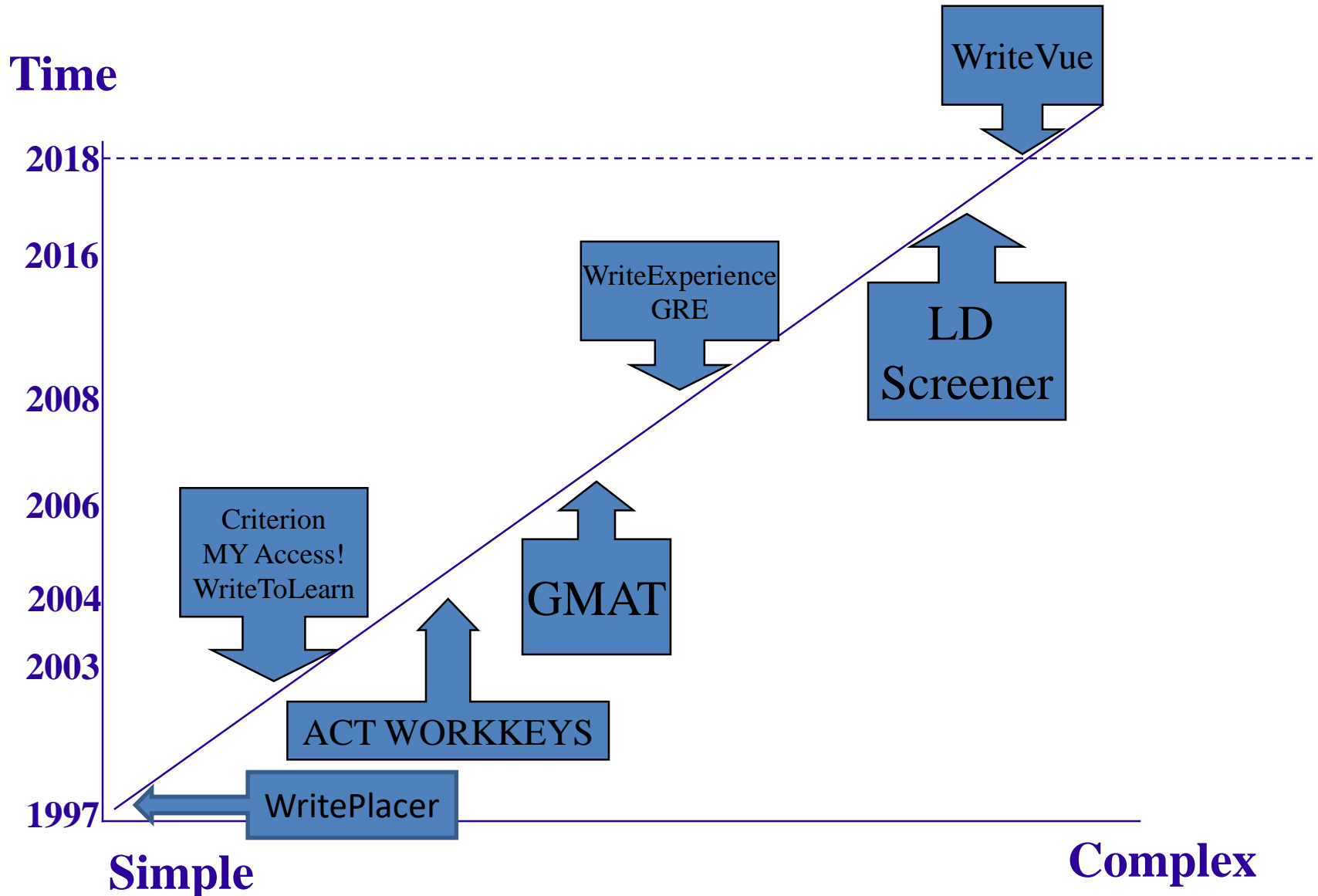
What levels of language are we measuring? Within the those levels of language, what domains are we measuring?

- Word Level
 - Spelling Accuracy
 - (Hauerwas and Walker, 2003; Houck and Billingsley, 1989; Nunes, Bryant and Bindman, 1997; Shankweiler, D., et al, 1995; Treiman, 1993; Treiman and Cassar, 1996; Treiman and Bourassa, 2000;)
 - Lexical Diversity
 - (Graham, Collins and Rigby-Wills, 2016; Scott and Windsor, 2000; Watkins, Kelly, Harbers and Hollis, 1995)
- Sentence Level
 - Sentence Complexity
 - (Hunt, 1970; Scott and Windsor, 2000)
 - Grammaticality
 - (Grela and Leonard, 2000; Mackie and Dockrell, 2004; Plaza and le Normand, 1996; Windsor, Scott and Street, 2000)
- Text Level
 - Written Productivity
 - (Graham, Collins and Rigby-Wills, 2016; Houck and Billingsley, 1989; Scott and Windsor, 2000)
 - Story Grammar
 - (Merritt and Liles, 1987; Roth and Spekman, 1986; Stein, Glenn and Freedle, 1979)

What's the connection?
Can humans keep up?



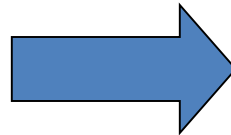
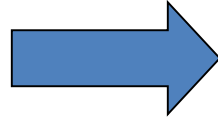
AI Implementation Milestones



Challenges Remain

- Bias
- Infrastructure
- Admitting the current state of affairs
- Trusting the data from a black-box
- Don't hold a machine to a higher standard than humans

Thought for the Day



Manning Hall Classroom, ca 1890 –Brown University

Manning Hall Classroom, ca 2003–Brown University

Thank You!

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