How Big Data Can Help You Personalize Learning
How Big Data Can Help You Personalize Learning

EdWeek Moderator: Sterling Lloyd, Assistant Director of EdWeek’s Research Center
Hello, I’m dave.

Dave Edyburn
Associate Dean for Research
College of Community Innovation & Education
University of Central Florida

Email: dave.edyburn@ucf.edu
Hello,
I’m martin.

Martin McKay
Founder & CTO at Texthelp

Twitter: @martinmckay
Email: m.mckay@texthelp.com
What we are covering today
About one-quarter of students perform at the Proficient level in writing

Twenty-four percent of students at both grades 8 and 12 performed at the Proficient level in writing in 2011 (figure A). The NAEP Proficient level represents solid academic performance for each grade assessed. Students performing at this level have clearly demonstrated the ability to accomplish the communicative purpose of their writing.

Figure A. Achievement-level results in eighth- and twelfth-grade NAEP writing: 2011

Grade 8

<table>
<thead>
<tr>
<th>Below Basic</th>
<th>Basic</th>
<th>Proficient</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>54</td>
<td>24</td>
<td>3</td>
</tr>
</tbody>
</table>

Grade 12

<table>
<thead>
<tr>
<th>Below Basic</th>
<th>Basic</th>
<th>Proficient</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>52</td>
<td>24</td>
<td>3</td>
</tr>
</tbody>
</table>

NOTE: Detail may not sum to totals because of rounding.
Writing Assessment Interface and Select Student Actions
Below is a snapshot of the interface students used as well as data on some of the actions they engaged in while viewing the prompts or editing their responses.

29% of eighth-graders used the thesaurus 1 or more times.

71% of eighth-graders used the text-to-speech function 1 or more times.

74% of twelfth-graders right-clicked to access the spell-check option 1 or more times.

80% or more of twelfth-graders did not use the cut, copy, and paste features.
Overview of Personalized Learning

Tailoring learning for each student’s strengths, needs and interests—including enabling student voice and choice in what, how, when and where they learn—to provide flexibility and supports to ensure mastery of the highest standards possible. (iNACOL, 2018)

https://www.inacol.org/news/what-is-personalized-learning/
### Personalization v Differentiation v Individualization Chart (v3)

There is a difference between personalization, differentiation, and individualization. One is learner-centered; the others are teacher-centered.

<table>
<thead>
<tr>
<th>Personalization</th>
<th>Differentiation</th>
<th>Individualization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Learner...</strong></td>
<td><strong>The Teacher...</strong></td>
<td><strong>The Teacher...</strong></td>
</tr>
<tr>
<td>drives their learning.</td>
<td>provides instruction to groups of learners.</td>
<td>provides instruction to an individual learner.</td>
</tr>
<tr>
<td>connects learning with interests, talents, passions, and aspirations.</td>
<td>adjusts learning needs for groups of learners.</td>
<td>accommodates learning needs for the individual learner.</td>
</tr>
</tbody>
</table>

Source: [http://www.personalizelearning.com/2013/03/new-personalization-vs-differentiation.html](http://www.personalizelearning.com/2013/03/new-personalization-vs-differentiation.html)
Adaptive Learning Technologies

The 2018 Horizon Report notes “advocates for adaptive learning believe that it can be a solution for the “iron triangle” of educational challenges: cost, access, and quality.”

How big data can help educators ...
A fitbit for learning
Learning Metrics

We use them already ..... 

Hasbrouck & Tindal’s research in 2005 and updated again in 2017 provide really useful data to help teachers assess how their kids are doing.

- Oral Reading Fluency
  - Words Correct Per Minute
  - Prosody
  - Smoothness
  - Pace
## COMPILED ORF NORMS

Hasbrouck & Tindal (2017)


<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentile</th>
<th>Fall WCPM*</th>
<th>Winter WCPM*</th>
<th>Spring WCPM*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90</td>
<td>97</td>
<td>116</td>
<td></td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>59</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>29</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>16</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>9</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>90</td>
<td>111</td>
<td>131</td>
<td>148</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>84</td>
<td>109</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>50</td>
<td>84</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>36</td>
<td>59</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>23</td>
<td>35</td>
<td>43</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>134</td>
<td>161</td>
<td>166</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>104</td>
<td>137</td>
<td>139</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>83</td>
<td>97</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>59</td>
<td>79</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>40</td>
<td>62</td>
<td>63</td>
</tr>
<tr>
<td>4</td>
<td>90</td>
<td>153</td>
<td>168</td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>125</td>
<td>143</td>
<td>160</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>94</td>
<td>120</td>
<td>133</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>75</td>
<td>95</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>60</td>
<td>71</td>
<td>83</td>
</tr>
<tr>
<td>5</td>
<td>90</td>
<td>179</td>
<td>183</td>
<td>195</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>153</td>
<td>160</td>
<td>169</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>121</td>
<td>133</td>
<td>146</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>87</td>
<td>109</td>
<td>119</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>64</td>
<td>84</td>
<td>102</td>
</tr>
<tr>
<td>6</td>
<td>90</td>
<td>185</td>
<td>195</td>
<td>204</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>159</td>
<td>166</td>
<td>173</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>132</td>
<td>145</td>
<td>146</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>112</td>
<td>116</td>
<td>122</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>89</td>
<td>91</td>
<td>91</td>
</tr>
</tbody>
</table>

*WCPM = Words Correct Per Minute*
There are chores to be done around the farm. These may be inside jobs such as making appointments to meet with your rural professionals, planning, purchasing or booking machinery or outside jobs like feeding out, setting up grazing for the herd, fencing or machinery upkeep or spraying for weeds in paddocks the cows have finished grazing.
What about writing?

Until recently the collection of data about childrens’ writing has been a labour intensive process, and aspects of their writing have been impossible to collect without technology.

- Writing Metrics that correlate with grade level:
  - Productivity
  - Writing speed
  - Writing Accuracy (Correct Word Sequences)
  - Writing Maturity
One means of quantitatively assessing writing is to use **Correct Word Sequences**.

This gives a student 1 point each time they make a sequence of two words without spelling, punctuation or grammar errors.
Write about your favorite game. Include at least 3 reasons why you like it.

Hide and Seek is a good game. I like playing that game at home because there is lots of places to hide. You can play it anywhere, anytime, anyplace. Third reason I like hide and seek is that you can pretend to play that game to hide away from your parents.
Sample

- Nationally stratified and representative sample.
- **1,000** students in grades 3 – 12 (100 per grade) from the standardization sample of the *Wechsler Individual Achievement Test – Third Edition* (WIAT–III®).
- 5 special studies:
  - Academically Gifted and Talented (GT; n = 61)
  - Mild Intellectual Disability (Mild Mental Retardation) (MID; n = 35)
  - Learning Disorder in Writing (LD-W; n = 44); comorbid LD–R acceptable
  - Learning Disorder in Reading (LD-R; n = 78); comorbid LD–W acceptable
  - Learning Disorder in Math (LD-M; n = 51); comorbid LD–R acceptable

Conclusions

This research supports CIWS as a valid and reliable measure of written expression (grammar and mechanics) for use with a diverse student population.

- **Inter-scorer Reliability** CIWS is a robust and highly reliable measure that is not sensitive to small amounts of variance in scoring.
- **Development Trends** CIWS means and standard deviations increase expectedly with grade level.
- **Demographic Bias** CIWS is an unbiased measure that is sensitive to validated gender and ethnic differences in writing ability. Such differences may be explained by cultural, environmental, and developmental factors.
- **Clinical Utility** CIWS differentiates between NA students and LD–W, LD–R, LD–M, MID, and GT groups.
Proven to be a great measure ....

But teachers are too busy to put this much time into assessment.
A fitbit for learning
The pursuit of independence in the later half of the 19th century in the American colonies developed slowly.

As punitive and onerous laws were imposed by the British crown and parliament, resentment grew among the American colonists.

In 1774 the colonists established a separate shadow government and began training troops near Boston Massachusetts.

After military conflicts in 1775 at Lexington and Concord and at the battle of Bunker Hill, the independence movement gained momentum.

George Washington named Commander of the Continental Army in March, 1776 and representative of each colony meet in Philadelphia in June 1776 to draft the historical Declaration of Independence.
We sought correlations in

- Correct Word Sequences per Min
- Text Maturity
With a sample of a student’s writing, and their grade level, we can now immediately place that sample in a percentile group with confidence.

We can show what aspects of their writing are above or below norms. Spelling, Punctuation, Grammar, Maturity, Speed

The teacher can personalise instruction based on this information.
Our vision

- Provide teachers with visibility of
  - How their students are writing
    - How often
    - How productive
    - How accurate (SPG)
    - How mature
    - All without Teacher Intervention
  - How their students are reading
    - How often
    - What reading age
    - What subject areas
    - What words they need help with
Questions?
Learn More: Adaptive Learning

Lessons Learned From Early Implementations of Adaptive Courseware

Personalized Learning
http://www.centeril.org/personalizedlearning/

When Success Is the Only Option
Learn More: Adaptive Learning

Learning Analytics
https://tech.ed.gov/learning-analytics/

Society for Learning Analytics Research
https://solaresearch.org/
Learn More: Privacy

Protecting Student Privacy
https://studentprivacy.ed.gov/

Student Privacy Pledge
https://studentprivacypledge.org/
Learn More: WriQ

Install WriQ by visiting:
https://text.help/EdWeekWriQ

Intro Video
https://text.help/mr4mEv

Support Articles
https://text.help/7kraQQ
How Big Data Can Help You Personalize Learning

EdWeek Moderator: Sterling Lloyd, Assistant Director of EdWeek’s Research Center