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Eye Tracking: Getting a View of Children's Strategic Reading Process

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Eye tracking

Getting a view of children's strategic reading process

A second grader is seated in front of a computer monitor in Wayne State University's children's reading lab, reading aloud from *The Wolf's Chicken Stew* by Keiko Kasza – a story of a wolf with exceptional culinary skills. As he reads, a cursor appears on the screen, marking the path that his eyes make as he reads: following the text, then zigzagging to the illustration of the wolf carrying a stack of pancakes, back to the text, then to a second illustration, showing that the time is night.

By tracking eye-movement patterns of elementary-age children while they read aloud, Karen Feathers, Ph.D., and Poonam Arya, Ph.D., both associate professors of teacher education in the College of Education, are discovering how elementary-age children strategically process text. Of particular interest is readers' use of visual cues within texts to construct meaning while reading.

"We set out to explore how children utilize both words and images to create meaning in various types of texts," Feathers said.

In their most recent study, Feathers and Arya had Detroit-area second and third graders read text from both authentic children's literature and basal readers – anthologies compiled by publishers for use in schools – on a computer screen. A camera below the monitor tracked eye movement by sending an infrared beam to the eye, determining the location of the gaze by the angle of the beam. A separate device was used to track head movement to ensure accuracy. Data was collected using an ASL model 504 eye tracker.

Robert Erlandson, Ph.D., professor of electrical and computer engineering in the College of Engineering, and Santosh Kodimiyala, research assistant in Erlandson's lab, developed EyeMotion,

a suite of software tools that provide easier viewing of eye tracking and optimize the data collection and analysis.

The analysis offered several insights into the strategies of the young readers. When a child encountered a difficult word, for example, Feathers and Arya found they used many resources and techniques to figure out the word, including rereading the sentence, rereading the paragraph, looking at other parts of the text and looking at illustrations. "When a child gets stuck on a word, they are often told to 'sound it out,'" Arya said. "But our research shows that teachers should encourage students to use a variety of strategies involving all elements of the text to help them understand."

The research also found that anthologies of children's literature can hinder effective reading



About Dr. Karen Feathers:

Dr. Feathers received a B.A. in English from Russell Sage College, an M.A. in English education from the State University of New York at Albany and an Ed.D. in reading from Indiana University. She is the coordinator of the Reading, Language and Literature program in WSU's Teacher Education Division. She joined Wayne State University in 1991.

To learn more, visit:

<http://coe.wayne.edu/ted/bio.php?id=42231>



About Dr. Poonam Arya:

Dr. Arya received a B.A. in English, an M.A. in English literature and an M.Ed. in reading education from Delhi University in India, and a Ph.D. in curriculum and instruction from the State University of New York at Buffalo. She joined Wayne State University in 2005.

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<http://coe.wayne.edu/faculty-staff/bio.php?id=42015>



About Dr. Robert Erlandson:

Dr. Erlandson received a B.S. in electrical engineering from Wayne State University and a Ph.D. in biomedical engineering from Case-Western Reserve University. He is the director of WSU's Enabling Technologies Laboratory. He joined WSU as a faculty member in 1975.

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“We set out to explore how children utilize both words and images to create meaning in various types of texts.”

— Dr. Feathers

because they contain alterations to the original story. “In anthologies, chunks of the story are removed, texts are condensed and pictures are rearranged or removed altogether,” Feathers said. “These changes make it more difficult to understand the events of the story chronologically and hinder children’s ability to correct their miscues.”

Feathers and Arya hope data from their study will help teachers more effectively respond to their students’ oral reading and provide strategies to improve comprehension. The results may also influence school districts’ selection of classroom texts, as well as publishers’ editorial decisions as they adapt texts for anthologies.

An earlier study by Feathers and Arya on the strategies second-graders use to process text was accepted to the journal *Literacy Research and Instruction*. The team plans to continue to deepen their understanding of the reading process by having subjects discuss how they use images during reading. Students will be asked to explain text features that hindered or contributed to their understanding of the text. “We hope we can further identify the elements that make things click for students and what strategies optimize their comprehension,” Arya said. “The results will not only help us improve school performance, but students may also be more likely to enjoy reading.”

