

## **Poster 5: Item Design for Multiple Choice Assessments of Online Reading Comprehension through Cognitive Lab Data**

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In Structured Poster Session: Division C – Learning and Instruction

### **Developing and Evaluating Three Formats for Assessing Online Reading Comprehension**

**Objectives.** This poster presents the results of cognitive labs (Ericsson & Simon, 1999) designed to inform development of a 16-item multiple-choice assessment that measures online reading comprehension (ORCA-Multiple Choice). This descriptive poster presentation is designed to: (1) describe the parallelism between open/closed formats and the multiple-choice items; (2) describe and display piloted items; and (3) explore final interface design that maintains ecological validity.

**Perspectives.** The item design was informed first using new literacies of online reading comprehension (Leu, Kinzer, Coiro, & Cammack, 2004). This theory defines reading online as a problem based task that requires students to locate, evaluate, synthesize and communicate online information. In addition, previous work using think-aloud data (Ericsson & Simon, 1993; Branch, 2000) as a tool to capture cognitive processes also informed item development.

**Methods and Data Sources.** Cognitive labs were conducted in one-on-one sessions with ten 7<sup>th</sup> graders from diverse school populations representative of those to whom the assessments will be administered. Our protocol informed think-aloud methods recommended by Afflerbach (2002) and Pressley and Afflerbach (1995) as well as procedures employed by ETS (Somerville, Smith & Macklin, 2008) and NAEP (Johnstone, 2007). Data sources included IshowU video recordings of online screen reading; participants' oral think-aloud comments; post-item interview questions; and observations of participants' behaviors captured with a customized cognitive lab interview booklet. Data was analyzed using inductive thematic analysis (Patton, 2002) to better understand students' experiences with each item and highlight common concerns with question stems, challenging vocabulary, perceived level of difficulty, and item authenticity.

**Results.** Results from the initial think-aloud suggest that the item format parallels the open/closed online reading comprehension assessments. Furthermore ecological validity was maintained by requiring students to navigate a combination of items involving static screenshots of websites, clickable search results, and embedded hyperlinks. Item difficulty was influenced by the level of inferential reasoning required to answer an item and the number of clicks required to reach the correct answer. Further design issues will focus on: 1) Creating a Facebook like environment that delivers multiple-choice items in the news feed, chat features, email, and simulated wiki; and 2) Testing for correlations between Internet self-efficacy, prior Internet use, and scores on the online reading comprehension MC assessment.

This poster will provide screenshots of example ORCA-Multiple Choice items. These items reflect the latest iteration of multiple-choice format. This poster will also discuss two main challenges faced by the researchers: 1) Identifying the amount of variance in scores that is explained by students' online reading comprehension ability rather than their ability to navigate

multiple windows and tabs within a browser; and 2) Different levels of Internet experience across SES school districts may explain the varying range of scores.

**Scholarly Significance.** The results of this study will inform researchers who wish to assess online reading comprehension through formats that are both practical and ecologically valid. Furthermore researchers can utilize the final assessment in future studies. These efforts can lead to the assessment of an essential area of reading comprehension research.

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