Project DIMES: Diagnostic Instrument for Morphology of Elementary Students

Topic and Goal: Reading and Writing, Goal 5 (Measurement)

Purpose: Project DIMES is a Goal 5 proposal to develop a computer adaptive, diagnostic assessment of teachable morphological skills for students in Grades 3 to 5.

Setting: The pilot, field test, and validity studies will be conducted in the Levy County School District and a special public school district funded by the Florida Department of Education.

Population/Sample: The districts that have committed to participating include a balanced distribution of third-, fourth-, and fifth-grade classrooms that serve approximately $N = 1,400$ students per year. The balancing was meant to ensure that we have a representative sample of grade level as seen in the national population. We selected the public schools in a manner that allows for a national representation of demographic variables including ethnicity, students with disabilities, English language learners, and free/reduced lunch status.

Assessment: We propose to create this measure because the development of morphological skills is essential to students' literacy growth and, hence, to a host of positive student education and academic outcomes. This is because knowledge of morphemes (e.g., root words like *nation,* prefixes like *inter,* and suffixes like *al*) supports students' reading achievement (Carlisle & Goodwin, 2013) by influencing their ability to decode and access the meaning of multisyllabic words (Carlisle, 2004), which then supports their reading comprehension (Carlisle, 2000; Nagy, Berninger, & Abbott, 2006). Recent articles in practitioner journals (Goodwin, Lipsky, & Ahn, 2012; Goodwin & Perkins, 2015; Lesaux & Kieffer, 2010; Pacheco & Goodwin, 2013) have highlighted ways to incorporate morphological instruction in teaching, yet there is a lack of valid and reliable assessments to guide this instruction. Our project seeks to remedy this deficiency by developing an assessment that can produce reliable diagnostic scores on teachable morphological skills of elementary students that can be validly used to provide efficient feedback to teachers about their students' morphological knowledge. Our project also intends to fill the need for standardized morphological skills assessment for conducting quantitative research and intervention research with elementary aged students.

Research Design, Methods, Key Measures, Data Analytic Strategy, and Outcomes:
Development of the assessment will be achieved through the use of evidence-centered design (ECD) for principled assessment development, and multiple iterations of validation methodologies that address content validity, response process validity, internal structure validity, external criterion validity, fairness, and validity related to test use. In addition, multiple methods are used for evaluating fairness with respect to content, statistical properties, fairness, and test use. Data will be collected throughout the project to support the development and gather various pieces of validity evidence. For external criterion validity, previously developed assessments on various reading constructs will be strategically gathered, administered, and compared to DIMES assessment scores. Computerized adaptive testing will serve as the psychometric method for assessment administration, allowing for individualized assessment that adapts to the appropriate level of knowledge of each student. Diagnostic classification modeling (DCM) will serve as the statistical theory for psychometric analysis and assessment construction. The outcomes of the project include all disseminated research and the finalized assessment, which will be made available to teachers and educational researchers nationwide.