Developing Basic and Higher Level Reading Processing Skills: Exploring Reading Instruction with the PIRLS Database

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Presented by:

Michael Deasy – University of Massachusetts Lowell

deasymj@aol.com
40 Heritage Lane Apt B8
Leominster, MA 01453
978-537-6893

Lorraine Dagostino – University of Massachusetts Lowell
James Carifio – University of Massachusetts Lowell
Mark Fenster – University of Notre Dame Maryland

Introduction

Concern by the United Nations about the state of universal literacy prompted the creation of the UN Literacy Decade (2003-2012) with the goal to raise literacy levels worldwide. In order to promote universal literacy, the United Nations identified three areas of focus for the UN Literacy Decade:1) to decrease illiteracy by 50%; 2) to increase the number of students in school; 3) and to provide support to schools to develop effective literacy programs (UNESCO, 2005). This study focused on the area of providing support to schools to develop effective literacy practices by exploring the relationship between an instructional framework (the Interactive Reading and Learning from Text instructional framework) (Singer & Donlan, 1989) and reading achievement on a fourth grade assessment (Progress in International Reading Literacy(PILRS) 2006) (Mullis et al., 2007) through initial and follow-up exploratory analyses involving discriminant, factor, and regression analyses along with analysis of variance techniques.

Need for the study.

Becoming literate offers people a way to engage effectively in their social and personal worlds. Specifically, becoming literate offers people a way to communicate with others, the means to learn about and construct an understanding of the world, a way to participate in the economic and political worlds of their local, national, and global communities, and a tool for helping people develop their full potential (Lind, 2008; UNESCO, 2005). Viewing literacy as a fundamental birthright, the United Nations included literacy as a basic human right in the Universal Declaration of Human Rights of 1948 (UNESCO, 2005). Although the literacy rate for adults has risen since 1947 from 56% to 80% in 2000, concern exists for the 20% of the adult population (861 million adults) who currently remain illiterate. Concern also exists for the 110 million children who are not in school and are therefore setting the stage for future illiteracy.

Sharing the concern about the need for global literacy, other agencies and organizations have joined the call to promote literacy for all people in order to help them fully participate in the global economy, to improve their standard of living, and to develop their full human potential (Center for Global Development, 2008; Friedman, 2007; & Heller and Greenleaf, 2007).

Research questions.

This study investigated the following research questions:

The following *core* research questions were initially investigated in this study:

C1) How well does the Interactive Reading and Learning from Text instructional framework discriminate (correctly classify) the level of reading performance students attain on the Progress in International Reading Literacy Study's (PIRLS) International Reading Benchmark scale?

C2) What instructional elements of the Interactive Reading and Learning from Text instructional framework best discriminate reading performance? and,

C3) How much of the variance in reading performance on the PIRLS test is explained by the Interactive Reading and Learning from Text instructional framework?

In follow-up analyses, the current study also investigated the following *exploratory* questions:

E1) What factors are affecting the ability of the Interactive Reading and Learning from Text instructional framework to discriminate (accurately classify) the reading performance level of students on the PIRLS International Reading Benchmark scale?

E2) What might be the best overall conceptualization of the instructional framework as represented by the PIRLS variables used in this study for discriminating (correctly classifying) the reading performance level of students on the PIRLS International Reading Benchmark scale?

E3) What do the results found in the current study indicate about the common practices of making comparisons and judgments about countries' reading performance on international reading assessments?

E4) After creating an index that describes the degree of fidelity of a school implementing a Singer-Congruent Program, is there a relationship between implementing a high fidelity Singer-Congruent Program and student reading performance controlling for student characteristics, program location and country?

Theoretical Framework

The theoretical framework for the study consisted of two parts. The first was the Interactive Reading and Learning from Text instructional framework, and the second was the Progress in International Reading Literacy Study 2006 database.

The Interactive Reading and Learning from Text instructional framework (Singer, 1985*;* Yopp & Singer, 1985; Singer & Donlan, 1989) is an instructional reading framework that is based on the interactive processing model of reading (Singer & Donlan, 1989). This instructional framework holds that a teacher can positively effect the outcome of a reading task for a student in three ways by: 1) modifying the text; 2) setting the goal of the reading task (assessment); and 3) activating or developing a reader's reader resources.

Reader resources are the collection of skills, strategies, and knowledge competencies that a reader employs when constructing meaning from text. As described by Singer and Donlan and other researchers, the reader resources that a reader draws on when interacting with text include: word recognition skills, reasoning skills, syntactic knowledge, semantic knowledge, ideational frameworks, and motivation to read (Singer, 1985*;* Yopp & Singer, 1985; Singer & Donlan, 1989).

The Progress in International Reading Literacy Study (PIRLS) 2006 (Mullis et al., 2007, Mullis et al., 2006) was the second administration of a large scale international reading trend cycle assessment that examined reading performance of fourth grade students in forty-five countries and political unions. The PIRLS assessment was first administered in 2001 and is scheduled to be repeated every five years.

The PIRLS reading assessment tested students on reading fiction and non-fiction material and consisted of reading a series of short reading passages (2-3 pages) and responding to multiple choice and open response writing questions. The questions called on students to process text at a variety of levels. The assessment consisted of ten blocks and each student was administered two blocks. An overall score was created for each student as if the entire test had been administered based on the score from the two blocks and the background characteristics of the student.

In addition to administering the reading assessment, the PIRLS 2006 study also collected data on the home, community, school, and instructional contexts within which the assessment took place with a series of questionnaires that were administered at the time of the assessment to the teachers, principals, parents and students. The survey data was combined with the PIRLS reading assessment results to create a large scale educational database that is publically available.

Literature Review

The Interactive Reading and Learning from Text instructional framework was developed and tested in California (Singer, 1985; Singer and Donlan, 1989). It has been found to be helpful in developing basic and advanced literacy skills in students from beginning reading to college reading (H. Yopp, 1987; R. Yopp, 1987; Singer and Bean, 1982; Singer and Donlan, 1989).

Synthesis research examining the development of individual reader resources outside the Interactive Reading and Learning from Text instructional framework has found that developing reader resources aids in bringing successful reading performance (Hiebert and Taylor, 2000; Pressley, 2000; Guthrie and Wigfield, 2000; Goldman and Rakestraw, 2000; Wade and Moje, 2000; Blachowicz and Fisher, 2000; Nagy and Scott, 2000; Tierney and Cunningham, 1984; Duke and Pearson, 2002). The instructional elements of the Interactive Reading and Learning from Text instructional framework mirror the instructional elements identified in recent synthesis studies of reading research (Snow, Burns, & Griffith, 1998; NICHD, 2000).

Studies have been undertaken examining the instructional techniques as predictor variables for reading performance from the PIRLS 2001 and PIRLS 2006 databases. Although the time spent on reading instruction has been found to be related to reading performance, the studies with the PIRLS databases overall have found a low relationship between reading instruction and reading achievement (van Daal, V., Begnum, A., & Solheim, R., 2006; van Diepen, M; Verhoeven, L., & Aarnouse, C., 2004; Papanastasiou, C., 2006; van Daal et al., 2008).

Studies investigating other large scale educational databases, however, have yielded insights on what instructional techniques are associated with student performance. Guthrie et al., (2000) found instruction that promoted reading engagement was associated with a better performance on the statewide Maryland School Performance assessment. He also found the same results when examining the NAEP results for Maryland students (Guthrie, 2001).

Methodology and Procedures

Introduction.

A construct of the interactive reading and learning from text instructional framework was created using the instructional variables in the Progress in international reading literacy study

2006 database. The relationship between the instructional framework and reading achievement on the PIRLS fourth grade reading assessment was investigated through initial and follow-up exploratory analyses involving discriminant t, factor, and regression analyses along with analysis of variance techniques.

Sample.

In order for this study to explore the Interactive Reading and Learning from Text instructional framework with the PIRLS 2006 database, a sample of five countries was selected. The countries, USA, England, Scotland, New Zealand, and Singapore were chosen because they all administered the test in English. In addition, they represented diverse geographic areas as well as a range of performance on the international assessment scale. They scored near the top, in the upper quartile and near the international average. The sample for this study consisted of 27,027 students in 882 schools and the average age of the students was 10.1 years.

Instruments.

The instruments used in this study consisted of the PIRLS reading assessment and the teacher and principal surveys. The PIRLS 2006 reading assessment consisted of ten reading passages covering informational and literature texts. Each passage was followed by approximately twelve questions for a total of 126 questions for the entire test. Since the entire test would take approximately seven hours to complete, PIRLS employed an Item Response Theory method of scoring which involved students taking only part of the test, but which generated accurate population estimates.

To obtain a score for each student, PIRLS used Item Response Theory (IRT) scaling combined with a multiple imputation or plausible value methodology. In this method, a student's correct answers on the test were combined with background characteristics in order to create a

score for the student as if he/she had taken the entire test. This approach allows for accurate estimates of a population's performance without having students take an entire assessment. It does not, however, allow for precise statements to be made about individuals (Martin, Mullis, & Kennedy, 2007).

The Progress in International Reading Literacy Study (PIRLS) 2006 reported scores in four ways. The first was overall achievement; the second was by type of comprehension processing; the third was by level of performance on the International Reading Benchmark scale; and the fourth was by the raw score (raw and standardized raw score).

The achievement scale has been divided into four categories (low, intermediate, high, and advanced). Students were assigned a benchmark level based on their overall achievement score. A description of the reading processes exhibited at each level has been created (Mullis et al., 2007). The description of the reading processes of the International Benchmark scale can be viewed as a continuum of reading processing skills from basic processing to advanced processing.

The Progress in International Reading Literacy Study (PIRLS) 2006 administered four surveys in order to collect data on the contexts around which the reading assessment occurred. The surveys were filled out by the classroom teacher, the students, the principal, and the parents.

Instructional constructs.

In order to study the relationship of instruction that develops reader resources and reading performance, this study created constructs of the Interactive Reading and Learning from Text instructional framework based on the PIRLS 2006 instructional variables. The instructional

variables were from the teacher and principal background surveys. This study investigated three constructs of the instructional framework. The first construct examined beginning reading instruction (K3), and it explored when the elements of beginning reading instruction each first became a major focus of instruction in the grades leading up to the fourth grade assessment. The second construct of the instructional framework examined intermediate reading instruction (Gr4), and it investigated the frequency of instruction at the fourth grade. The third construct combined the constructs of the beginning reading (K3) instruction and intermediate (Gr4) instruction. The selection of the instructional variables from the database to represent the instructional constructs came from a review of the instructional literature for each reader resource. Constructs were created to represent word recognition skills, reasoning skills, syntactic knowledge, semantic knowledge, ideational frames, and motivation to read.

Steps in the initial analyses.

Initial core analyses were then performed with the instructional constructs and the reading assessment scores exploring the relationship between reading instruction and reading performance. In the initial analyses, regression, discriminant and factor analyses procedures were performed on each of the five countries for the two constructs of reading instruction (beginning and intermediate reading) and on the overall construct (beginning and intermediate reading combined). In these analyses, the independent variables were the instructional constructs and the dependent variables were the scores on the reading assessment (overall and benchmark categories). During the initial analyses, each country was analyzed individually, and then the five countries were combined and the analyses repeated.

Steps in the follow-up exploratory analyses.

After the initial core analyses were performed, a series of follow-up exploratory analyses were carried out to further explore the relationship between reading instruction and the performance on the fourth grade assessment. In the follow-up exploratory analyses, the countries were split into two educational systems: the USA educational system and the British educational system (England, Scotland, and New Zealand). Singapore was removed from the analysis. The benchmark scales were collapsed from five to three categories. Discriminant analyses were recalculated and ANOVAs were performed.

During the follow-up exploratory analyses, the instructional variables were further divided to represent a high, medium and low implementation of a Singer-like instructional program. In order to analyze the variability of the implementation of the level of instructional program, two sets of ANOVAs were calculated. In the first set of ANOVAs, the level of implementation of the instructional program was the dependent variable and the country, school location, gender, general reading level of the class, and the benchmark score were the independent variables. In the second set of ANOVAs, the benchmark score was the dependent variable and the level of implementation of the instructional program, the country, school location, gender and general reading level of the class were the independent variables.

Results: Initial Analysis

The initial discriminant analyses of the ten instructional profile indicators done with the student's benchmark achievement category as the criterion measure for the individual countries and for the five countries combined found two to three underlying discriminant dimensions accounting for 65% to 70% of the variance that correctly classified students' benchmark reading achievement category as follows: the correct classification percentages, in general, were stronger

for the lowest and the highest benchmark categories of the PIRLS reading achievement measure ranging from 30.8% correct classification (in England) to 46.1% correct classification (in Singapore) at the *lowest* category and 24.2% (in Singapore) to 49.5% (in the USA) correct classification in the *highest* category. However, the ten instructional framework variables had a much lower correct classification rate or discriminating ability in the middle categories of the benchmark reading achievement measure ranging from 9.5% to the mid 20% range (with some exceptions). When the countries were combined, the discriminating pattern followed what had been observed in the individual countries. The range of classification was 10.8-42.7% with the top category classification being the best. Follow-up secondary discriminant analysis found a classification rate of 9.9%-42.7% using the four instructional framework profiling variables that had the highest discriminant function weights. When beginning reading instructional variables and the intermediate instructional variables were examined, the discriminant analysis yielded a similar profile to the overall instructional profile. The ten instructional profile variables for the degree to which a student received a Singer-like instructional program, therefore were able to discriminate the best and worst reading achievement level categories in the PIRLS data set with reasonably decent, but not in the middle three reading achievement level categories. The regression analysis found that the individual countries R squares ranged from .015 (Singapore) to .066 (England). The combined five countries had an R squared of .024. The early reading instructional profile had an R squared of .015 and the intermediate instructional framework had an R squared of .009.

A one-way MANOVA was calculated examining the effect of country on the ten instructional elements that were the individual indicators of a Singer-like instructional program.

The results indicated that instruction differed by the country. Follow-up ANOVAS found that all ten instructional elements were different by country as were indicator profiles by country.

Initial factor, discriminant, and regression analyses were performed on the ten instructional elements of the Singer-like instructional framework to assess the structure and validity of the framework as a construct. For each individual country, and the five countries combined, factor analyses found that the number of underlying components (or factors) ranged from 2-3, and the amount of variance explained by the factor structures for the ten instructional variables ranged from 53% for New Zealand to 70.4% for the USA. When countries were combined, the amount of variance explained was 57% and the number of underlying components for the ten instructional profile indicators was two.

The core research questions of the initial analysis were answered in the following ways:

C1) The framework discriminated well at the top end and at the lower end of the benchmark scale. It did not discriminant well in the middle categories.

C2) Word recognition consistently was identified as discriminating the best. Processing and engaging with text instructional variables were variable predictors by country.

C3) Between 1.3 and 6.2% of the variance was explained by the instructional framework. The instructional framework was stronger when viewed overall with early reading and intermediate reading instruction combined then when each level of instruction (beginning and intermediate) were viewed separately.

Transition to the Exploratory Analyses

Due to the low classification ability of the middle categories of the benchmark scale and the variability of the countries in the data set when analyzed as five individual countries, a follow-up exploratory analysis was done. In the exploratory analysis, a new construct was

created. The benchmark categories were collapsed from five to three with the top category staying as it was while the middle two categories were combined, and the lower two categories were combined. Due to its uniqueness, Singapore was removed from the study and the remaining four countries were used to create two educational systems for analysis. The USA educational system made up of the USA data and the British educational system was made up of the data from England, Scotland, and New Zealand.

Results: Exploratory Analysis I

When performing a discriminant analysis with the new instructional construct of the USA and the British educational systems using the collapsed benchmark categories, the overall instructional framework correctly classified 31.7% of the cases. The range of correct classification was 25.2% -53.1%. Correct classification was strongest at the top level (above 625-advanced) at 53.1% followed by the low level (474 and below-low benchmark and the low benchmark) at 39.2% and it was weakest at the middle level (475-624 -intermediate and high benchmark levels) at 25.2%.When the educational systems were examined individually, the USA system (27. 9%-55.2%) correctly classified students slightly better than the British system (23.5%-52.6%). Both however, followed the same pattern of successful classification in that the top category classified the best followed by the lowest category and then the middle category.

Fisher's linear discriminant function found that in the USA, when beginning reading instruction (K3) (word recognition and ideational frames instruction) occurred early, and intermediate instruction(Gr4) (word recognition instruction and motivation to read instruction) occurred often, then the student's performance was predicted to score at the high benchmark category. On the other end of the scale it found that when early word recognition (K3) instruction occurred not as early, and motivation to read (Gr4) instruction occurred not as often,

and ideational frames instruction (K3) and word recognition instruction (Gr4) remained the same (early and often) then the student was predicted to score in the low benchmark category.

The instructional elements identified in the discriminant analysis for the British educational system were word recognition K3, word recognition Gr4, and reasoning skills Gr4. When examining Fisher's linear function, it was found that when beginning reading word recognition instruction was set early, while intermediate word recognition was set at very little and, intermediate reasoning skills were set at a moderate (once or twice a week) level, then students were predicted to perform at the high benchmark. On the other end, when word recognition K3 was set at early, while intermediate word recognition and reasoning skills instruction were set at occurring frequently (daily or almost daily), then students were predicted to perform at the low benchmark category.

In order to get a sense of the impact of socio-economic status and ability on the students' reading performances, a regression analysis with a forced entry of variables was performed. The analysis entered social economic status variables and student ability variables first and then entered the instructional variables. In this analysis, SES accounted for about 2%, while student characteristics accounted for 3% and instruction for another 2% for a combined 7% of the variance explained.

The first two exploratory research questions were answered in the following way: E1) Socio-economic factors as represented by the community that the school is located in and student background characteristics of reading level, weakly impacted the ability of the Interactive Reading and Learning from Text instructional framework to discriminate the reading performance of students. E2) The best overall conceptualization of the instructional framework seemed to be to create two educational systems (USA and British educational systems) and to

collapse the benchmark categories down to three categories as it then correctly classified *31.7%* of the cases as compared to a total of 7% for all predictor variables in the multiple regression model. It classified strongest at the top level (above 625-advanced) (53.1%) followed by the low level (474 and below-low benchmark and below the low benchmark) and it was weakest at the middle level (475-624 -intermediate and high levels) 25.2%. Fisher's linear discriminant function found that in the USA, when beginning reading instruction (K3) (word recognition and ideational frames instruction) occurred early, and intermediate instruction(Gr4) (word recognition instruction and motivation to read instruction) occurred often, then the student's performance was predicted to score at the high benchmark category. When early word recognition (K3) instruction occurred not as early, and motivation to read (Gr4) instruction occurred not as often, and ideational frames instruction (K3) and word recognition instruction(Gr4) remained the same (early and often) then the student was predicted to score in the low benchmark category.

The instructional elements identified in the discriminant analysis for the British educational system were word recognition K3, word recognition Gr4, and reasoning skills Gr4. When beginning reading word recognition was set at early, while intermediate word recognition was set at very little, and finally, intermediate reasoning skills were set at a moderate instructional delivery (once or twice a week), the student performance was predicted to score at the high benchmark. When, word recognition K3 was set at early, while intermediate word recognition, and reasoning skills instruction were set at occurring frequently (daily or almost daily), the student performance was predicted to be at the low benchmark category.

Results: Exploratory Analysis II

For the exploratory analysis II, a composite of the ten instructional variables was created. The composite was divided into three levels representing a high, medium, and low implementation of a Singer-like instructional program index. The composite variable was also subdivided to form constructs of beginning reading instruction and intermediate reading instruction. In order to examine the relationship between the school and student characteristics, and the level of implementation of a Singer-like instructional program, correlations and ANOVAS were carried out.

A Singer-like instructional program was found to benefit both top and struggling readers making the program beneficial to a wide range of readers. British students in urban classes of above average readers who received a high implementation of a Singer-like program had higher reading achievement scores than students who received a medium or a low implementation of a Singer-like program. Below average readers in the USA also benefited from having a Singer-like instructional program. In the USA, for urban classes of below average readers, reading achievement scores for a high implementation of a Singer-like instructional program were higher than reading achievement scores for a medium implementation. For beginning reading instruction in the USA, the results were even stronger in favor of a high implementation of a Singer-like instructional program. For beginning reading in the USA, in urban classes of below average readers, reading achievement scores were highest for a high implementation of a Singer-like instructional program. Intermediate reading presented a more mixed reading achievement level profile.

The third and fourth exploratory research questions were answered in the following way: E3) From a global evaluation perspective, the results provide insights for policy makers into how

to interpret large scale reading assessments, and that much caution and careful analyses need to be done.

The second exploratory analyses also involved creating a Singer's level of program implementation index and the index was used to address exploratory research question E4. E4) The results found that in certain situations, under certain conditions, a high degree of a Singer-like instructional program was related to a positive result on the benchmark scale. For example, classes of below average readers in urban settings who received a high degree of a Singer-like beginning reading instructional program performed better than similar students who received a medium or a low degree of a Singer-like beginning reading instructional program.

Discussion/Conclusions Relevant to the Major Findings of the Study

Policy implications.

The analyses undertaken comparing countries were predicated on the idea that the dependent variable represented the same structure for each country. In order to compare total scores, the dependent variable needed to be represented by the same factor structure. These results indicated that the five countries did not all share the same factor structure. With the factor structures identified, the USA and England could be compared with confidence. Scotland could be compared with England and the USA with some caution, while New Zealand could be compared with more caution, and Singapore could be compared with the most caution.

How to go about making comparisons between countries on large scale international assessments is a topic in the current research literature. In a study investigating how to make

valid country comparisons involving the TIMSS (Third International Mathematics and Science Study) 1999 study, Wu, Li & Zumbo (2007) explored six countries from the TIMMS 1999 math and science study of eighth graders. They found that qualitative differences existed when the countries' factor structures were compared and that the countries grouped by common cultures. Countries with common cultures were found to have similar factor structures while countries with different cultures had different factor structures. Wu, Li & Zumbo's conclusion was that the factor structures of countries with different cultures were different enough that the dependent variables did not represent the same metric, and therefore the total scores did not mean the same thing and could not be compared validly.

The idea of analyzing international data by disaggregating it and making equivalent comparisons matches the recent report from the International Reading Association's PISA/PIRLS task force (Brozo, Valtin, Garbe, Sulkunen, Shiel & Pandian, 2012). In the report, the task force members recommended making equivalent country comparisons in order to get a more accurate picture of how a country is performing. For example, on the most recent PISA assessment, the USA scored tied for 7th among the countries and political subdivisions who took the PISA assessment (OECD, 2010). When the results were disaggregated by race and SES factors, it was found that USA white students scored as the third highest country in the world, and that USA students in low poverty schools (a 10% or less free/reduced lunch rate) scored as the top country in the world. USA schools in high poverty areas (a 75% or more free/reduced lunch rate) scored in the lower third of the countries worldwide. A more complete picture of the USA's performance came when the data was disaggregated and equivalent comparisons were made.

Both the IRA task force report (Brozo et al., 2012) and Wu's et al., (2007) study indicated that simplistic comparisons of total scores did not present the entire picture when making country comparisons on international assessments. Their recommendations of comparing countries with common factor structures and common subgroups match the findings of this present study.

In future studies involving large scale international literacy assessments, the conclusion is that it will be important to determine if the qualitative structure of the dependent variable is similar between the countries before making country comparisons.

In terms setting reading policy, the results of the PIRLS assessment and examining the within country variation can show a country what aspects of reading instruction need to be strengthened. A country could use the results to identify subgroups who are not performing as well as other groups in the country. In terms of evaluating existing policy, a school, state, or national educational body could have implemented a reading initiative that was focused on low readers. The data could be analyzed to determine how well the program initiative is achieving its goal. Examining subgroup variability could help indicate who the policy is working for or for whom it needs to be adjusted.

Instructional implications.

When examining the two educational systems (USA and the British educational system), the exploratory analysis identified word recognition K3, ideational frames K3, word recognition Gr4, and motivation to read Gr4. The instructional elements were further refined by calculating Fisher's linear discriminant function. For the USA, during the exploratory analysis, Fisher's linear discriminant function found that when beginning reading instruction (K3) (word recognition and ideational frames instruction-an aspect of comprehension instruction) occurred

early, and intermediate instruction (Gr4) (word recognition instruction and motivation to read instruction) occurred often, then the student's performance was predicted to score at the high benchmark category. On the other end, it found that when early word recognition (K3) instruction occurred not as early, and motivation to read (Gr4) instruction occurred not as often, and ideational frames instruction (K3) and word recognition instruction(Gr4) remained the same (early and often) then the student was predicted to score in the low benchmark category.

These results connect to the existing body of reading research by identifying similar elements that were reported in two recent research synthesis studies of reading instruction- the Report of the National Reading Panel (NICHD, 2000) and Preventing Reading Difficulties in Young Children (Snow, Burns & Griffith, 1998). The National Reading Panel (2000) identified word recognition and comprehension as among the five major reading instructional elements. Preventing Reading Difficulties in Young Children (Snow et al., 1998) also identified word recognition and comprehension instruction and added motivation to read among the elements it identified.

This study unifies the findings of both synthesis studies by identifying word recognition, comprehension instruction and motivation to read instruction. Motivation to read instruction had been included in Preventing Reading Difficulties in Young Children (Snow et al., 1998) but left out in the Report of the National Reading Panel (NICHD, 2000). The results of this study indicate that the framework of reading instruction can include word recognition, comprehension instruction and motivation to read activities.

This current research study, expanded on the Report of the National Reading Panel (NICHD, 2000) and Preventing Reading Difficulties in Young Children (Snow et al., 1998) by examining the relative priority of the elements of reading instruction. The discriminant analysis,

factor analysis and the stepwise regression consistently identified word recognition as very important for reading instruction. Next identified were motivation to read, connecting to texts, reasoning skills and ideational frameworks. This finding suggests that perhaps these identified instructional elements cut across general student lines and are universally needed by most students. The other instructional elements investigated- vocabulary knowledge, syntactic knowledge, may be more specific to what individual students need and are not as universally needed by all students.

The best overall conceptualization of the instructional framework (E2) had instruction that occurred early and frequently and involved word recognition instruction, comprehension instruction, and motivation to read activities. The best conceptualization also found that the instructional framework worked best in particular situations such as with low readers in urban settings in the USA.

The results found that in certain situations, under certain conditions, a high degree of a Singer-like instructional program was related to a positive result on the benchmark scale. For example, classes of below average readers in urban settings who received a high degree of a Singer-like beginning reading instructional program performed better than similar students who received a medium or a low degree of a Singer-like beginning reading instructional program.

Limitations

The first limitation was that two-way to four-way interactions between the instructional variables, school setting, student background characteristics and benchmark reading achievement scores were present in the data set. The presence of interactions indicated that statements made about the relationship between the instructional program a student experienced and reading

achievement needed to be made with qualifications as to the conditions under which the instruction and the reading performance occurred.

The second limitation was that the parts of the teacher and principal surveys concerning reading skills instruction were focused on traditional basal reading instruction, and therefore, may not have captured all the reading skills instruction that was occurring at the schools.

The third limitation was that the sample was not a random sample of the countries that participated in the PIRLS assessment. Since English was the native language for four of the five countries in the study and was the language of reading instruction in all five countries, a limitation exists concerning being able to generalize the results of the study to countries that provide reading instruction in a language other than English.

The fourth limitation in this study concerned the technical aspects of the Item Response Theory techniques that were used to score the test. The PIRLS assessment used Item Response Theory (IRT) to score the assessment. Using Item Response Theory and creating plausible values for students allowed for the creation of a good estimate of a population's performance without unduly burdening students with a long test. The limitation, however, is that this approach does not allow for analyzing individual performance and that conclusions that generalize can only be made to the student population and not about individual students.

Areas of Future Research

The findings and limitations of the study suggest a number of areas of future research. First, this study was carried out with students who took the test in English. An area of future research would be to see if the findings replicate when English is not the language of the assessment.

A second area of research would be to analysis students individually in terms of student characteristics. Including individual student data about reading level would allow the relationship between instruction and reading achievement to be more finely delineated.

A third area of future research would be to further refine the elements of the instructional construct that represents the reader resource of word recognition. The word recognition construct could be divided so that a construct of fluency (automaticity) could be examined to see if fluency should be viewed as an independent reader resource rather than as an extension of word recognition skills in beginning reading instruction.

A fourth area would be to further delineate the conditions under which the degree of implementation of a Singer-like instructional program is related to positive reading achievement.

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