

Enhancing Parent Involvement in NC-CCSS for K-2 Mathematics At P. W. Moore Elementary School

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Abstract— In this study, the 2015 Research Experience Undergraduates (REU) mathematics team from Elizabeth City State University (ECSU) extended the research initiated by the 2014 summer REU mathematics team. A workshop was provided to assist parents to a better understanding of student homework assignments on the North Carolina Common Core State Standards for K-2 Mathematics. Parent involvement is defined as parent participation in the educational processes and experiences of their children. A chi-square analysis was used to analyze data collected from a pre-survey and post survey administered to participants in the workshop. The study revealed all of the individual components of parent involvement were positively and significantly related to educational goals. The study identified aspects of parent involvement that yielded statistically significant results in affirming that parent involvement attributed positively to urban student achievement. These findings were particularly helpful for indicating which kinds of parent involvement influenced academic success. Remarkably, parent expectations and styles demonstrated a strong relationship with scholastic outcomes. Parent expectations and styles created an educationally oriented ambience that established an understanding of certain level of support the child needed to succeed academically. The REU mathematics team focused on three essential questions in this study: (1) What practices will increase parent awareness of K-2 NC-CCSS for mathematics at P. W. Moore Elementary School? (2) What methods can be used to strengthen parent skills in assisting with mathematics homework assignments at P. W. Moore Elementary School? (3) What actions can be taken to motivate parent involvement in the school improvement process focusing on mathematics at P. W. Moore Elementary School?

Key Terms — Parent Involvement, Common Core State Standards, Homework, K – 2 Mathematics

I. INTRODUCTION

In the spring of 2015, mathematics team members from the Center of Excellence in Remote Sensing Education and Research (CERSER) undergraduate research experience (URE) program at Elizabeth City State University in northeastern North Carolina, embarked on an ambitious research effort entitled Enhancing Parent Involvement in NC-CCSS for K-2 Mathematics. The main goal of the research was to develop training sessions for parents and guardians of K-2 students attending P.W. Moore Elementary School to enhance mathematics skills. Over an eight-week period, the research team researched ways parents and guardians would become more involved in NC-CCSS in mathematics for their K-2 children. The purpose of this research was to investigate the parent involvement levels of parents with primary school students. Research from NC-CCSS and the National Council for Teachers of Mathematics (NCTM) described ways parent involvement was beneficial and led the research team to develop workshops and surveys to acquire measurable data on the instructional approaches of parents in the home setting [11]. The results of the study articulated the roles parents played in the lives of their child or children where two goals came to play a central role:

- Identifying ways in which parents can assist their child and/or children—and being an adolescent while simultaneously becoming and being a mathematics learner.
- Identifying the knowledge, professional development, and resources parents draw on as they engage in this particular academic and social context [10].

The Common Core State Standards were built on what are supposed to be the best of high-quality mathematics standards across the country. The new standards incorporate some of the most important international models for mathematical practices, as well as, research and input from numerous sources including: state departments of education, scholars, assessment developers, professional organizations, educators, parents, students, and the general public [7]. These standards define what students should understand and be able to do in continuation of their mathematical studies [2]. Under the Kindergarten mathematics standards, instructional time should focus on the representation and comparison of whole numbers and the descriptive analysis of shapes in objects of their everyday environment. In the 1st grade, students continue to develop their addition and subtraction strategies. These developments aid them in problem solving with larger numbers [12]. As students progress to the 2nd grade, educators' pedagogical approach should target the extension of base-ten notation, the fluency in addition and subtraction, the use of standard units of measurement, and the understanding of complex shapes. Teachers have the opportunity to create individualized approaches to relate the standards of the Common Core domains in their elementary classrooms [4]. To make the promise of mathematics improvement a reality, the design of the mathematics standards allow instructor's and educators' to create curriculums of similar content teachable to all students [1].

II. STATEMENT OF PURPOSE

This research observed data to draw two solutions in the form of (1) what parents knew about North Carolina Common Core State Standards and (2) how they were active in their child's education in the areas of K-2 Mathematics. Parent Involvement is defined as the support parents and guardians give toward school related activities. It consists of committed time, energy, and good will to encourage success in their child's education. Parents' behaviors in the home and school settings typically motivate their children's educational progress [13]. Parent Involvement is generally thought of as an avenue for promoting academic performance. However, parent involvement may also enhance children's behavior at home and in the classroom as the parents and teachers work together [3]. A major challenge many are facing is determining if parent involvement is actually beneficial and whether or not the involvement of parents actually aids the increase in academic performance for students [14].

Research says that the earlier parents become involved in children's education, the more powerful the outcome. To determine children's academic achievement, parents' confidence in their children's education at school becomes a contributing factor to success [9]. Consequently, those children who perform exceptionally well have parents who set high standards for them. Parent Involvement is closely related to the improvement of schools and the lack thereof becomes a problem [10].

III. PURPOSE

The purpose of this research was to develop training sessions in mathematics support skills for parents and/or guardians of K-2 grade students enrolled at P. W. Moore Elementary School. Parents' attitudes toward mathematics have an impact on children's' attitudes. This process will extend mathematical concepts from the classroom to home and establish the idea that mathematics is not just a school subject, but also an everyday subject.

IV. RESEARCH QUESTIONS

The following research questions guided this study.

1. What practices will increase parent awareness of K-2 NC-CCSS for mathematics at P. W. Moore Elementary School?
2. What methods can be used to strengthen parent skills in assisting with mathematics homework assignments at P. W. Moore Elementary School?
3. What actions can be taken to motivate parent involvement in the school improvement process focusing on mathematics at P. W. Moore Elementary School?

V. SURVEY INSTRUMENT

Pre and post surveys were used to gauge workshop results pertaining to Parent Involvement. These surveys consisted of twenty-five questions which addressed the following: North Carolina Standards for K-2 grade mathematics; parent's skills/understanding of children's mathematics homework; and parent's participation in school related activities. In these questions, parents chose their level of agreement using a range from 1-5: 1 as strongly disagree, 2 as disagree, 3 as neutral, 4 as agree, and 5 as strongly agree. Once pre surveys were distributed parents would attend an educational workshop pertaining to their child's grade level. At the conclusion of the workshop, parents completed post surveys to assess whether or not the information was conveyed correctly.

VI. METHODOLOGY

Mathematics Team members in the REU program at ECSU worked to build a data collection system specifically for this research. This collection system provided an assessment of K-2 grade parents and their current

knowledge pertaining to the North Carolina Common Core State Standards. In preparation for the research workshop, the mathematics team went to P. W. Moore Elementary School to observe the interactions between teachers and students in Kindergarten, 1st grade, and 2nd grade. Information was collected concerning the benefits of parent involvement and its relation between the Common Core State Standards for K- 2 grade mathematics. Once a survey was constructed, the three focal points were presented by the mathematics team at a workshop; formatted to supply the parents with some of the information and activities needed to assist their child at home. On the day of the workshop, the mathematics team arrived early at P.W. Moore Elementary School to organize each member’s designated grade level area. After parents arrived, a brief introduction was given stating the purpose and goal of the workshop. The parents were split into three different workshops pertaining to their child’s grade level. A pre-survey was completed at the beginning of the workshop and a video was viewed that explained the importance of the Common Core State Standards and the key attribute that all children despite background are given the same advantages to an education. Using the mathematics activities in relation to each grade level respective Common Core State Standards, parents constructed miniature activities to introduce to their children in the home environment [9]. Throughout the activities, parents were encouraged to use mathematics language in their homes allowing their child to become accustomed to using different learning styles. The parents were also informed of the benefits as they continue to become more involved in their children’s education. At the conclusion of the workshop a post-survey was administered to determine if their perspective on assistance with mathematics changed in comparison to their pre-survey. To conclude the workshop, parents were given participation awards and parent helper kits to continue in their efforts of being involved in their child’s education.

The survey instrument consisted of three focus sections. In these twenty-five questions, participants were asked to select their level of agreement with each of the statements for their knowledge of North Carolina Common Core State Mathematics Standards for their children and their level of satisfaction with their with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

VII. PARTICIPANTS

Participants for this study were selected using a voluntary response method. The mathematics team in collaboration with the administration of the school mailed 125 flyers to P.W. Moore Elementary School parents of

Kindergarten, 1st grade, and 2nd grade students. There was a participation rate of 20% in comparison to the number of flyers sent out to parents. Of those who responded, participants demonstrated a strong interest for involvement in their child’s education. The participants in this study were 33% male and 67% were female.

VIII. CHI-SQUARE TEST

The Chi-Square Test showed a comparison of the observed values (parents’ survey response) and the expected values (parents’ strong agreement), which are listed above and concluded that the impact of the Parent Involvement Workshop was considered to be a positive factor in influencing parents’ attitudes toward the research focus questions. In the analysis of the pre and post surveys, the Chi-Square Test determined a statically significant relationship exists.

$$\chi^2 = \sum \frac{(\text{Observed} - \text{Expected})^2}{\text{Expected}}$$

Pre Survey for Kindergarten Chi Square Test				
0.816536798	0.51412362	0.883171378	0.883171378	0.162606262
0.455937195	0.085586791	0.92407596	0.616305225	0.779187716
0.946307674	0.883171378	0.851382575	0.991467607	0.897691671
0.997822863	0.946307674	0.224820642	0.574903424	0.92407593
0.92407593	0.637119407	0.595548507	0.739918292	0.816536798

Post Survey for First Grade Chi Square Test				
0.999728667	0.99999958	0.001966995	0.987809831	0.99999641
0.99999641	0.99998394	0.99994961	0.99999641	0.99998394
0.99999641	0.99999641	0.999873664	0.99999641	0.99999641
0.99994961	0.99999641	0.999873664	0.99998394	0.999873664
0.99999958	0.99994961	0.99999958	0.99994964	0.995027368

Pre Survey for First Grade Chi Square Test				
0.054280552	0.173522716	0.211644484	0.14871972	0.244258546
0.47735613	0.173522716	0.22212358	0.378862888	0.173522716
0.267987205	0.426663308	0.443263278	0.061093509	0.173522716
0.2442585546	0.47735613	0.132097256	0.378862888	0.306598116
0.191837347	0.410386118	0.22212358	0.394447922	0.306598116

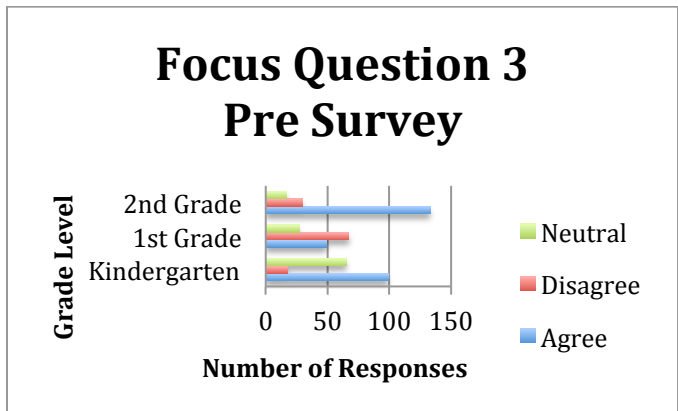
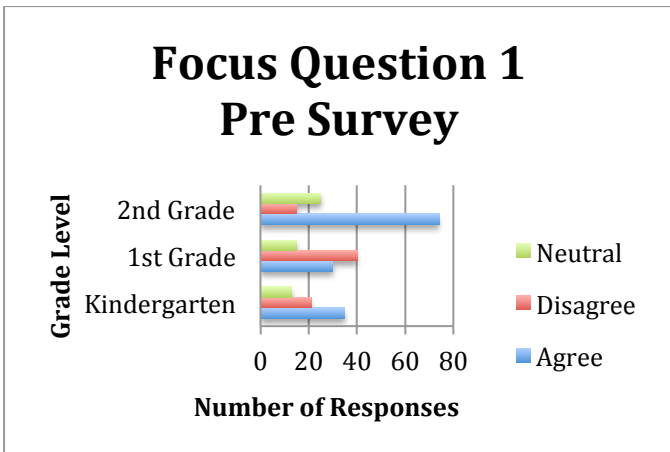
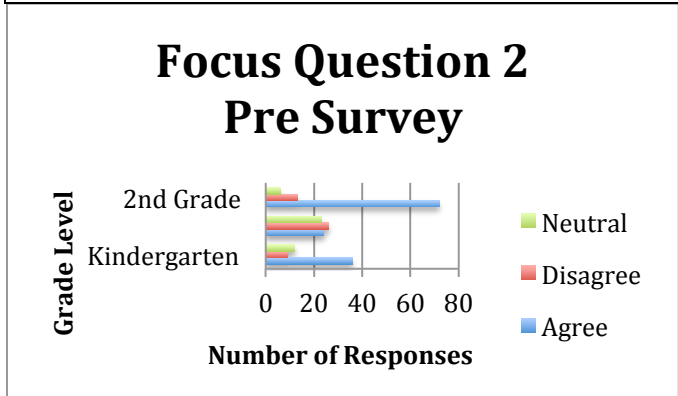
Pre Survey for Second Grade Chi Square Test				
0.762183463	0.982829904	0.982829904	0.855789985	0.867463996
0.979430546	0.867463996	0.988405921	0.942146779	0.996553861
0.990638066	0.955380899	0.966491465	0.942146779	0.97558938
0.961195794	0.990638066	0.878648247	0.878648247	0.988405921
0.979430546	0.670257798	0.606302782	0.990638066	0.996553861

Post Survey for Second Grade Chi Square Test				
0.991467607	0.99776595	0.999988388	0.999988388	0.999776595
0.999776595	0.999988388	0.999933619	0.999933619	0.999988388
0.999988388	0.999776595	0.999988388	0.999933619	0.999933619
0.999988388	0.999988388	0.999999443	0.999933619	0.999988388
0.999933619	0.999999443	0.999933619	0.999933619	0.999988388

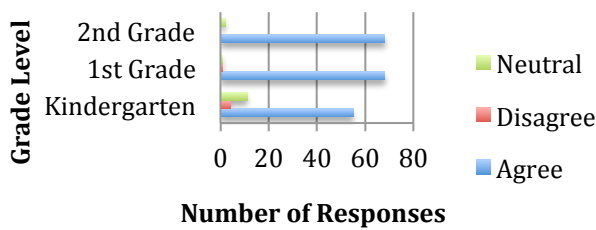
IX. RESULTS

The results of data gathered from the pre-survey and post-survey instruments were used to determine whether or not the information conveyed during the workshop produced any changes in parents' attitudes toward homework assistance K-2 mathematics and involvement in school instructional activities. The graph scales were determined by calculating a perfect 5 on the Likert scale and multiplying this level to the number of questions in the pre survey and post survey while lastly multiplying the total number of parent participants, giving a total level agreement to 1000. This scale was divided into groups pertaining to the number of questions in respect to the main three focus questions.

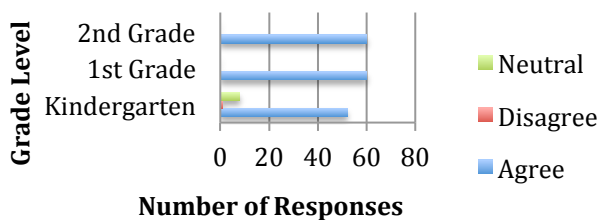
Post Survey for Kindergarten Chi Square Test				
0.99634689	0.83430826	0.996334689	0.996334689	0.996334689
0.897762597	0.955834726	0.816536798	0.996334689	0.998821103
0.946307674	0.994249945	0.983452951	0.994249945	0.996334689
0.983452951	0.98789554	0.98789554	0.971699157	0.99782286
0.994249945	0.998821103	0.991467607	0.883171378	0.994249945



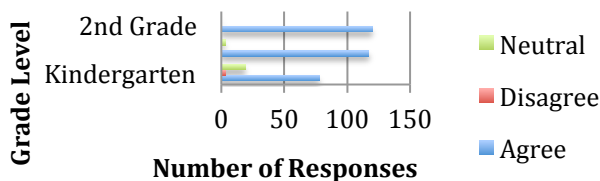
Focus Question 1 Post Survey



Focus Question 2 Post Survey



Focus Question 3 Post Survey



X. CONCLUSION

The results of the surveys concluded that Parent Involvement contributes to growth in student learning. Involved parents accomplish things, including motivating and engaging their children, acquiring new knowledge and skills, and collaborating with teachers. But those accomplishments best serve their purpose when they lead their children to help improve student achievement. The workshop provided richer information on what skills and topics students are learning according to the North Carolina Common Core State Standards. Assisting parents in an understanding of the

standards provided the parents with a different perspective on mathematics and the importance of being involved with their child's education. Parents understood the mathematics language by constructing different activities during the workshops and were given different tips that can be used in the home. Take-home activities and tips given in the parent tool kits benefited parents in assisting with student homework and learning. Most education reformers agree that improving student learning defines effective teaching. The best way to enhance parent involvement is to provide parents with guidance that is grounded in the standards and school—that is, parent use involvement to encourage student learning [10].

XI. FUTURE WORK

The long-term goal is to build a stronger parent support system in Kindergarten, 1st grade, and 2nd grade Mathematics in Pasquotank County Public Schools using the North Carolina Common Core State Standards. It is our intent to continue working with Title I elementary schools in the Pasquotank County Public School System. The mathematics team will provide an increased number of workshops during the next school year to strengthen parent attendance and student achievement of K-2 mathematics.

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