



“POWDERED EGG SHELLS” AS A VERSATILE INSTRUCTIONAL AID IN TEACHING KINDERGARTEN PUPILS ON LETTER COGNITION: A MULTISENSORY APPROACH TO TEACHING

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Abstract: *Most children arrive in kindergarten filled with curiosity, wonder, and an enthusiasm to learn about themselves, others, and the world. Each year, the researcher/adviser saw how pupils, who have difficulty learning their letters, also struggle with learning the letter’s sound, blending sounds, and then reading words. The teacher/researcher also knows how these kids struggle with letter recognition which directly impacts their reading and writing skills. This action research determined the effectiveness of the proposed instructional intervention using Multisensory approach in teaching letter cognition among the Kindergarten pupils. It is found that the said approach with the improvised instructional material is more effective as compared to the traditional approach on visual and auditory activities. It is therefore recommended to continue the use of the proposed instructional intervention.*

I. INTRODUCTION

Kindergarten is a critical year for all children—a year of transition from preschool programs or home to formal schooling. Most children arrive in kindergarten filled with curiosity, wonder, and an enthusiasm to learn about themselves, others, and the world. A teacher’s role and responsibility is to nourish this hunger for knowledge, and to motivate and challenge the students, as well as to protect and nurture them.

The process of learning for children at this age is as important as performance and products. Several studies have demonstrated that high-quality kindergarten programs have long-lasting positive effects on academic achievement. Children who see themselves as competent learners tackle challenges with confidence, and develop attitudes and dispositions that encourage their curiosity and eagerness to learn.

As a Kindergarten teacher in Bayabat Elementary School, a public school, the researcher saw firsthand how pupils enter school with a variety of prior experiences and levels of ability.



Each year, she saw how pupils, who have difficulty learning their letters, also struggle with learning the letter's sound, blending sounds, and then reading words. The teacher/researcher also knows how these kids struggle with letter recognition which directly impacts their reading and writing skills.

Teachers have to assist children in making numerous visual, auditory, and kinesthetic-tactile connections. Multisensory approaches to teaching reading are based on the idea that many students learn best when teachers present their lessons through different modalities. When a teacher uses a multisensory approach, students are learning using two or more modalities at a time. In addition, multisensory instruction means using visual, auditory, kinesthetic, and tactile senses to learn. It is highlighted that, although it was thought that multisensory methods were only useful for special education students, research has shown that many students can benefit from multisensory instruction.

Hence, the researcher engaged kindergarten pupils with a combination of visual, auditory, and kinesthetic/tactile activities in order to improve their letter recognition abilities.

II. REVIEW OF RELATED LITERATURE

Recent research indicates that, "reading depends first and foremost on visual letter recognition" (McCormick & Zutell, 2011, p. 448). Studies have shown that the knowledge of letter names is the best predictor of success in reading. McCormick and Zutell (2011) stress that when children struggle with reading it promotes displeasure, indifference and avoidance for reading. They emphasize that children who fall behind in reading early in their schooling will continue to lag behind their classmates, which is known as the "Matthew Effect". This is because children who read will tend to read more, but children who struggle with reading tend to read less and their reading skills do not advance (McCormick & Zutell, 2011).

Lennon and Slesinski (1999) suggest that early reading deficits may result in overall problems with academic learning. They agree that, in order to advance, students require direct and intensive instruction at the beginning stages of reading. They believe that intensive instruction provides a diagnostic criterion among students who are easy to remediate, hard to remediate, or truly learning disabled. They concur that students should receive intensive reading instruction before being classified as special education students (Lennon &



Slesinski, 1999).

Bara, Gentaz, Cole, and Sprenger-Charolles (2004) recommend that students should receive instruction that develops their phonological and phonemic awareness. They feel that phonological awareness and phonemic awareness are not enough for students to develop their phonological decoding skills. Their study shows a more effective foundation for students is to receive training in phonological awareness and letter knowledge when learning how to read. McCormick and Zutell (2011) confirm that in order for students to become successful readers they need to acquire phonological awareness, phonemic awareness, and the alphabetic principle.

According to Caldwell and Leslie (2013), “phonological awareness is the understanding that the English language contains units of sounds that vary in size” (p. 47). They report, “Some of the units have many sounds that are in a syllable and others have just one sound” (p. 47). This study demonstrates that, “Children learn to distinguish the larger units of sound before the smaller units” (p. 47). Caldwell and Leslie conclude that there are three levels of phonological awareness that are important for reading development: the syllable, onset-rime, and phoneme. Current research reveals that children’s phonological awareness should be developed before children start school.

Marcia (1998) emphasizes that children require effective intervention that “stimulates and encourages oral language” (p. 23). This research proposes that in order to develop a child’s phonological awareness, a child needs to hear words that are articulated clearly and have an awareness of speech patterns and phonemes. Marcia suggests that children need to become aware of the placement of their tongue and their mouth and throat muscles while they are speaking. Caldwell and Leslie (2013) agree that phonological awareness has a broader focus which includes identifying and manipulating larger parts of spoken language, such as words, syllables, onsets and rimes, phonemes, and awareness of the other aspects of sounds, such as rhyming, alliteration, and intonation.

Findings from research on phonemic awareness advise that phonemic awareness can be taught and learned. As children learn to read, their phonemic awareness continues to develop (Armbruster, Lehr, & Osbon, 2000). It is important for students to continually develop their phonemic awareness, so they have an easier time learning how to read (McCormick & Zutell, 2011). Recent studies found that the continual development of



phonemic awareness early in school was critical to children's success in learning to read (Graves, Juel, Graves, & Dewitz, 2011).

Phonemic awareness is the insight that spoken words are made up of a sequence of separable sounds (McCormick & Zutell, 2011). Phonemic awareness also involves the understanding that spoken words are made of separate sounds that can be analyzed, manipulated, and represented in print (Lennon & Slesinski, 1999). To build phonemic awareness, children need to hear words as a sequence of sounds and then link those sounds to letters (Armbruster et al., 2000).

According to Foorman et al. (2003), in kindergarten it is important that reading instruction contains phonemic awareness activities that help children grasp the idea of how letters relate to speech sounds. This study shows that what seems to make the biggest difference is instruction where sounds are blended and segmented in speech, and then connected explicitly and systematically to letters in print (Foorman et al., 2003).

Current research points out that if children do not know letter names and shapes, they need to be taught them along with phonemic awareness (Armbruster et al., 2000). In addition, phonemic awareness is important because it is the ability to consciously blend sounds into words, segment words into sounds and rapidly name letters (Foorman et al., 2003).

This study substantiates that phonemic awareness and the ability to rapidly name letters has to be achieved in order to read words, which requires the reinvention of the alphabetic principle. This research shows that this is because of the intentional connections that have been made between alphabetic letters and the sounds they represent (Foorman et al., 2003).

The alphabetic principle is the insight that spoken words can be written by letters (McCormick & Zutell, 2011). In order for children to understand the alphabetic principle, they must understand the concept that letters represent sounds (Gunning, 2010). Marcia (1998) proposes that it is important for teachers to introduce the alphabetic code because not all children can master the code without help. She recommends that the alphabet must be explicitly taught, and the differences between uppercase and lowercase letters must be pointed out. Marcia emphasizes that letter recognition is one of the key tasks of learning to read. This task is difficult because the English language is not consistent with its one-to-one relationships between letters and sounds (McCormick & Zutell, 2011). This is



important because students need to recognize letters and their distinguishing features in order to effectively work with print (McCormick & Zutell, 2011). Letter names provide clues to the sounds associated with the letter, because if a student forgets the sound that a letter represents, the letter's name may help the student remember (Gunning, 2010). As a result, when students learn letter names, they are also learning letter sounds (Gunning, 2010).

Marcia (1998) points out that teachers can also teach common letter patterns, along with the corresponding sounds. McCormick and Zutell (2011) caution that children need to understand the connections between 44 phonemes (sounds) of spoken English and the 26 letters that they represent. This is why that a child who can figure out which sounds are represented by letters has a powerful tool for reading words, according to McCormick and Zutell. On the other hand, a child who cannot figure out letter/sound correspondences will be unable to decode a word that he has not previously read (McCormick & Zutell, 2011). Lennon and Slesinski (1999) warn that when children do not understand the alphabetic principle, they are likely to fall behind their classmates.

According to Lennon and Slensinski (1999), research has found that direct, early instruction based upon a combination of "comprehension based" strategies and "code oriented" strategies that emphasize the alphabetic principle is important in reading achievement. They explained, "code based" approaches like the Orton-Gillingham method advocate the use of "multisensory" instruction to compensate for deficits through the stimulation of multiple senses. One of the advantages of multisensory instruction is that it can engage each child's different learning style (Shams & Seitz, 2008). Shams and Seitz (2008) indicate that, "Information entering the system through multiple processing channels helps circumvent the limited processing capabilities of individual channels and thus, greater total information can be processed when spread through multiple senses" (p. 415).

Bara et al. (2004) found that, "the effects of adding visuo-haptic and haptic exploration of letters in a reading intervention program for kindergarten students designed to develop phonemic awareness and letter recognition and letter-sound recognition" (p. 435). The results of the study showed that, "Incorporating the visuohaptic and haptic exploration increases the positive effects of the intervention on the understanding and use of the alphabetic principle for children and their reading level" (p. 435). At present, there are



several multisensory instruction techniques that use a mixture of visual, auditory, tactile-kinesthetic approaches (Shams & Seitz, 2008). Orton concurred with Fernald and Keller's (as cited in Marcia, 1998) earlier research that showed, "lip and hand kinesthetic elements seem to be the essential link between the visual cue and the various associations" (p. 8). Gillingham and Stillman (as cited in Marcia, 1998) believe that "Children should see a letter, trace it, and then say the letter name and the corresponding sound connection in order to learn their letters and corresponding sounds" (p. 10).

Current research validates Orton's principles of reading instruction within a structured sequential multisensory model. Instruction must be based on learning the structure of the English language and its alphabetic code, and contain phonologically based training (Marcia, 1998). Flynn (2005) notes that the Orton Method stresses the importance of the senses of seeing, hearing and feeling. She explains that learning takes place through visual, auditory, and kinesthetic-tactile modalities. These modalities process information in a way that helps students to compensate for specific processing difficulties. Additionally, the kinesthetic-tactile modality is activated by motor activity through body muscles and speech organs which functions as the "glue that bonds the information to the brain" (Flynn, 2005, p. 20). Flynn suggests, "Starting with the teaching of individual letters, the visual and auditory pathways are strengthened by the simultaneous introduction of the motor elements of speech and writing" (p. 20). Students benefit because, "Multisensory instruction establishes the association between letter units and their sounds in both directions" (p. 20). Flynn reported, "That this association is developed when students see a letter and say a sound and then the teacher says a sound and students respond by naming the letter and writing it" (p. 20). Additional research that supports multisensory approaches includes Thorpe and Borden's (1985) study which provides an explanation for positive results generated through the use of multisensory instruction. Thorpe and Borden explain that, "children's visual attention is drawn to manual tasks and that the manual component increases a student's visual attendance of what is being learned" (p. 279). Their research supports that these findings are powerful because the visual and auditory modalities are thought to be the most efficient of all of the sensory receptors. Thorpe and Borden propose that students, "cannot effectively trace a letter or word without looking at it" (p. 279). Their research suggests that a kinesthetic/tactile element increases the probability of visually attending to the



learning task because, “Multisensory approaches produce superior results in on task behaviors and short-term learning” (p. 286). Additionally, Thorpe and Borden propose that the kinesthetic/tactile component keeps students attending to instruction and enhances their learning.

III. STATEMENT OF THE PROBLEM

This Quantitative Action Research was employed to assess the impact of Powdered Egg Shells as a versatile instructional material in teaching letter cognition among the Kindergarten pupils in Bayabay Elementary School. It is a Multisensory approach which involves visual, auditory and tactile activities aimed to develop mastery among the pupils.

Specifically, it sought answers to the following:

1. What is the Pre-test score of the Control Group?
2. What is the Pre-test score of the Experimental Group before the implementation of the instructional intervention?
3. Is there a significant difference between the Pre-test scores of the Control Group and the Experimental Group?
4. What is the Post-test score of the Control Group under the Traditional Approach using Auditory and Visual Activities in teaching letter cognition?
5. What is the Post-test score of the Experimental Group under the Multisensory Approach using Auditory, Visual and Tactile Activities in teaching letter cognition?
6. Is there a significant difference between the Post-test scores of the Control Group and the Experimental Group?

IV. SCOPE AND LIMITATION

The Action Research was employed among the Kindergarten pupils in Bayabat Elementary School, Tabuk City Division for School Year 2016- 2017.

There is only one Kindergarten in the school. The class with 17 pupils, where 11 are males and 6 are females was divided into two groups. They will be randomly distributed and divided in two groups.

This study was delimited to the Kindergarten pupils, particularly in their lesson on Letter Cognition.



V. METHODOLOGY

A. Sampling

Total Population Sampling was the sampling technique used. This type of Purposive sampling involves examining the entire population that have a particular set of characteristics. This is common if the population is relatively small. As a consequence, the Kindergarten class which is composed of 17 pupils only was immediately representing the entire population of kindergarten pupils in Bayabat Elementary School for the School Year 2016 to 2017.

B. Data Collection

In order to determine the level of identification of the Kindergarten pupils on the different letters of the alphabet, upper and lower case letters, the researcher/adviser conducted a Pre-assessment activity where each pupil from the Control Group and the Experimental Group was asked to identify random letters which were being shown. This was done before the application of the intervention in the Experimental Group using multisensory activities (visual, auditory and tactile activities) while the Control Group maintained the traditional approach, visual and auditory activities. It was noted that there is a significant increase in the performance of the pupils under the Experimental Group as compared to the amount of letters that can be identified by the pupils in the Control Group.

A Post-Assessment activity was also conducted in order to find out if there is a significant difference between the pupils in the Control Group and the Experimental Group.

C. Ethical Issues

For ethical considerations, before the conduct of the study, the researchers sought permission from all the concerned authorities such as: School Head and parents/guardians of the pupils. Moreover, confidential information will not be disclosed unless allowed by the people involved in the study. Principles of justice were applied among the participants.

D. Plan for Data Analysis

This research used Quantitative design where an interactive activity based from standard resources served as the primary tool or the Pre and Post Assessment tool in gathering the needed data.

Inferential Statistics was also used to quantify the numerical data from the assessment activities given.

Paired sample t-test is the statistical technique was used to compare the 'before-after' scores of the kindergarten pupils.



VI. RESULTS AND DISCUSSION

Table1. Scale of How Many Letters Identified (Upper and Lower Case)

| Letters | Scale | Scale Description |
|---------|-----------|-------------------|
| 18-26 | 2.01-3.00 | 3 (Very Good) |
| 9-17 | 1.01-2.00 | 2 (Good) |
| 0-8 | 0-1.00 | 1 (Poor) |

Problem 1: What is the Pre-test scores of the Control Group?

Table 2. Pre-Test Result of the Control Group (Upper Case) N= 9

| Scale | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| 3 (Very Good) | 0 | 0 |
| 2 (Good) | 2 | 22.22 |
| 1 (Poor) | 7 | 77.78 |
| Total | 9 | 100 |

Mean: 1.222 (Good)

As shown on the table, the Mean scores of the pupils under the Control Group in Letter cognition of Upper case is 1.222 which indicates that their performance is good in the Pre-Assessment test.

Table 3. Pre-Test Result of the Control Group (Lower Case) N= 9

| Scale | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| 3 (Very Good) | 0 | 0 |
| 2 (Good) | 1 | 11.11 |
| 1 (Poor) | 8 | 88.89 |
| Total | 9 | 100 |

Mean: 1.111 (Good)

As shown on the table, the Mean scores of the pupils under the Control Group in Letter cognition of Lower case is 1.111 which means that their performance is good in the Pre-Assessment test.

Problem 2: What is the Pre-test scores of the Experimental Group?

Table 4. Pre-Test Result of the Experimental Group (Upper Case) N= 8

| Scale | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| 3 (Very Good) | 0 | 0 |
| 2 (Good) | 3 | 37.5 |
| 1 (Poor) | 5 | 62.5 |
| Total | 8 | 100 |

Mean: 1.3750 (Good)



As shown on the table, the Mean scores of the pupils under the Experimental Group on Letter cognition of Upper case is 1.3750 which means that their performance is good in the Pre-Assessment test.

Table 5. Pre-Test Result of the Experimental Group (Lower Case) N= 8

| Scale | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| 3 (Very Good) | 0 | 0 |
| 2 (Good) | 2 | 25 |
| 1 (Poor) | 6 | 75 |
| Total | 8 | 100 |

Mean: 1.250(Good)

As shown on the table, the Mean scores of the pupils under the Experimental Group on Letter cognition on Lower case is 1.250 which means that their performance is good in the Pre-Assessment test.

Problem 3: Is there a significant difference between the Pre-test scores of the Control Group and the Experimental Group?

Table 6. Summary of T-test for the Pre-Assessment Test (Upper Case)

| Groups | Means | sd | T-value | P-value |
|--------------------|--------|---------|---------|---------|
| Control Group | 1.2222 | .44096 | 0.224 | .675 |
| Experimental Group | 1.3750 | 0.51755 | | |

As shown on the table, the t-value which is 0.224 is lower than the p-value of .675, this means that there is no significant difference between the mean scores of the Control Group and the Experimental Group in the Pre-Assessment Test. This means that the performance of the two groups in Letter cognition on Upper case is the same which is good.

Table 7. Summary of T-test for the Pre-Assessment Test (Lower Case)

| Groups | Means | sd | T-value | P-value |
|--------------------|-------|---------|---------|---------|
| Control Group | 1.111 | 0.33333 | 0.159 | .702 |
| Experimental Group | 1.250 | 0.46291 | | |

As shown on the table, the t-value which is 0.159 is lower than the p-value of .702, this means that there is no significant difference between the mean scores of the Control Group and the Experimental Group in the Pre-Assessment Test. This means that the performance of the two groups in Letter cognition on Lower case is the same which is good.



Problem 4: What is the Post-test scores of the Control Group?

Table 8. Post-Test Result of the Control Group (Upper Case) N= 9

| Scale | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| 3 (Very Good) | 2 | 22.22 |
| 2 (Good) | 4 | 44.45 |
| 1 (Poor) | 3 | 33.33 |
| Total | 9 | 100 |

Mean: 1.889(Good)

As shown on the table, the Mean scores of the pupils under the Control Group in Letter cognition of Upper case is 1.889 which means that their performance is good in the Post-Assessment test.

Table 9. Post-Test Result of the Control Group (Lower Case) N= 9

| Scale | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| 3 (Very Good) | 2 | 22.22 |
| 2 (Good) | 5 | 55.56 |
| 1 (Poor) | 2 | 22.22 |
| Total | 9 | 100 |

Mean: 2.000 (Good)

As shown on the table, the Mean scores of the pupils under the Control Group in Letter cognition of Lower case is 2.000 which means that their performance is good in the Post-Assessment test.

Problem 5: What is the Post-test scores of the Experimental Group?

Table 10. Post-Test Result of the Experimental Group (Upper Case) N= 8

| Scale | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| 3 (Very Good) | 6 | 75 |
| 2 (Good) | 2 | 25 |
| 1 (Poor) | 0 | 0 |
| Total | 8 | 100 |

Mean: 2.7500 (Very Good)

As shown on the table, the Mean scores of the pupils under the Experimental Group in Letter cognition of Upper case is 2.7500 which means that their performance is very good in the Post-Assessment test.

Table 11. Post-Test Result of the Experimental Group (Lower Case) N= 8

| Scale | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| 3 (Very Good) | 5 | 62.5 |
| 2 (Good) | 3 | 37.5 |
| 1 (Poor) | 0 | 0 |
| Total | 8 | 100 |

Mean: 2.6250 (Very Good)



As shown on the table, the Mean scores of the pupils under the Experimental Group in Letter cognition of Lower case is 2.6250 which means that their performance is very good in the Post-Assessment test.

Problem 6: Is there a significant difference between the Post-test scores of the Control Group and the Experimental Group?

Table 12. Summary of T-test for the Pre-Assessment Test (Upper Case)

| Groups | Means | sd | T-value | P-value |
|--------------------|--------|--------|---------|---------|
| Control Group | 1.8889 | .78174 | 2.798 | .250 |
| Experimental Group | 2.7500 | .46291 | | |

As shown on the table, the t-value which is 2.798 is higher than the p-value of .250, this means that there is a significant difference between the mean scores of the Control Group and the Experimental Group in the Post-Assessment Test. This means that the performance of the pupils in Upper cased-letter cognition under the Experimental Group is better than the performance of the pupils in the Control Group.

Table 13. Summary of T-test for the Pre-Assessment Test (Lower Case)

| Groups | Means | sd | T-value | P-value |
|--------------------|--------|--------|---------|---------|
| Control Group | 2.0000 | .70711 | 2.095 | .901 |
| Experimental Group | 2.6250 | .51755 | | |

As shown on the table, the t-value which is 2.095 is higher than the p-value of .901, this means that there is a significant difference between the mean scores of the Control Group and the Experimental Group in the Post-Assessment Test. This means that the performance of the pupils in Lower cased-letter cognition under the Experimental Group is better than the performance of the pupils in the Control Group.

VII. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Based from result of the study, the following were concluded:

1. There is no significant difference between the performance of the Control Group and the Experimental Group in Upper and Lower Case Letter Cognition in the Pre-Test.
2. There is a significant difference between the performance of the Control Group and the Experimental Group in Upper and Lower Case Letter Cognition in the Post-Test.



3. Multisensory Approach using Visual, Auditory, and Tactile Activities in teaching Letter Cognition is effective. The use of Powdered Egg-Shells as instructional materials have significantly improved the performance of the pupils under the Experimental Group as compared to the performance of the pupils under the Control Group using the traditional approach, visual and auditory activities

RECOMMENDATIONS

1. Teachers, School administrators and Division coordinators need to plan together a curriculum and a classroom environment that ensures all children are being challenged at their individual levels of development.
2. Teachers must be skillful and unobtrusive questioners, drawing on children's observations and insights when possible before imposing their own. They must encourage children to talk about their own reasoning as well as to consider each others reasoning. The more children can personally extend their own activities, the more they will make knowledge their own.
3. Parents and extended families play a crucial role in their children's development. Teachers can, for instance, offer "home learning kits" on topics of interest to enhance parents' success in supporting learning at home.

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