

# Effect of Fine Motor Skill activities on Handwriting of Low Achiever Students and High Achiever Students at Elementary Level in Khyber Pakhtunkhwa, Pakistan

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## Abstract

This study was carried out to find the Effect of fine motor skill activities on handwriting of low achiever students and high achiever students at elementary level in Khyber Pakhtunkhwa, Pakistan. In developing writing, the students are required to learn fine motor skills while working firsts in groups and then independently. With accurate fine motor skills, the students can increase their writing. That is why the researcher conducted this experimental study to get the hypotheses tested. For this purpose two teaching-learning techniques. Lecture demonstration method and teaching motor skill activities were used. Both the groups were treated to observe the desirable impact of fine motor skills on writing of Kindergarten class students. The sample for such study was taken from Girls Primary School Pabbi Nowshera. The subjects were divided into Control and Experimental groups on the basis of pre-test. Both the groups were given treatment to investigate: (i) Effects of fine motor skills on writing of low achievers students, (ii) Effect of fine motor skills on writing of high achievers students, (iii) to compare the effect of fine motor skills on writing of both low achievers and high achievers students. At the end of the treatment/interventions activity, a Post- Test was conducted to the sample. The numerical data thus collected was analyzed and interpreted by implying statistical tools.

**Keywords:** Motor skill, hand writing, elementary level, effect, techniques, tools

## Introduction

Handwriting is one of those important skills for future reading, communication, and written expression. That's why it's important to make sure the building blocks for handwriting are solid. If you need a strong foundation of fine motor skills to complete handwriting tasks, but

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they are not the same. Since, handwriting problems often lead to a lack of fine motor skills, there are many other areas that need to be considered by a physician or teacher to deal with writing problems. A very common problem that many parents or teachers notice in handwriting is a wrong pencil grip. It is generally believed that poor pencil grip leads to poor handwriting skills. Handwriting is an important functional task that needs to be performed by children in the lower grades of elementary school, and it is an essential ability for academic achievement (Cahill, 2009). However, because the time period in which children attempt handwriting varies according to the maturity of the nervous system, environmental experience, and the level of interest in letters (Laszlo & Bairstow, 1984), it is important to verify in the early stages of development whether children have problems in performing the task of handwriting (Desai & Rege, 2005).

In order to evaluate the ability of handwriting performance in children, various dimensions must be considered, including the domain of handwriting, legibility, speed, and ergonomic factors (Amundson & Weil, 1992). Among these dimensions, legibility signifies the legibility of their handwriting. The factors that influence handwriting legibility include the shape of the letters, the size of the letters, the arrangement of the letters, and the amount of space between the letters (Amundson & Weil, 1992; Schneck & Amundson, 2010). Before beginning the act of handwriting, children need to develop readiness skills for forming letters, such as the comprehensive abilities of various sensory motor systems, the development of large and small muscles, visual perception, fine motor skills, and in-hand manipulation skills (Lamme, 1979; Donoghue, 1985). If children without sufficient development of such readiness skills learn handwriting, they are at risk of developing bad handwriting habits, which may lead to difficulties in developing handwriting legibility (Alston & Taylor, 1987). There are various factors connected to acquiring readiness skills before starting handwriting.

Among these factors, fine motor skills allow for the demonstration of good handwriting legibility through the ability to control a handwriting tool with speed and accuracy over the course of activities such as fine motor precision, manual dexterity, and in-hand manipulation (Alston & Taylor, 1987; Exner, 1992). As such, fine motor skills are essential for children to develop before developing the repeated behaviour of holding appropriate writing utensils (Henderson & Pehoski, 2006). Previous research has focused on the factors and correlation between visual perception and visual motor integration.

The present study was conducted to find the effect of fine motor skills activities on the handwriting of low achievers students and high achiever students at the elementary level in Khyber Pakhtunkhwa.

### **Increasing Fine Motor Skills**

"Activities to promote fine motor development need to be geared toward the kindergarten students' developmental levels, not their age levels" (Cantu, 2004). As mentioned previously, parents and teachers need to pick activities that do not tire or frustrate young kindergarten students. One answer is to provide materials for diverse skill levels. For example, parents and teachers can provide multiple types of balls, such as rubber, spongy, fluffy, or light (Poole et al. 2005). "The use of scissors can also have the power to improve fine motor skills and support hand-eye coordination." As mentioned, "the most beneficial use of scissors is freehand cutting because it offers kindergarten students a choice, allows their own ideas to

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evolve, and sets the atmosphere for flexible thinking" (Suzanne, 2005).

Accordingly, "different activities and supplies are more appropriate and beneficial for different developmental stages." Typically, toddlers benefit most from selected craft activities that enhance dexterity, coordination, and strength of grasp patterns. Cantu (2004) cites "playing with sand scoops, sifters, containers, rollers, and pudding paints, and scribbling with crayons or magic markers are all appropriate activities" (Cantu, 2004). Cantu (2004) states that "pre-schoolers' craft materials might include paint; paper of various colours, shapes, and sizes; glue; blunt-nosed scissors; chalk; fabric of various textures, large beads and cord, and materials from nature such as bark; leaves; flowers; and coloured stones." School-aged kindergarten students benefit from modelling clay, models, paint projects, needlepoint, drama props, and costumes. Collecting stamps, shells, and any other little treasures can promote small muscle development. Projects like woodworking, copper tooling, gardening, and journaling can also be beneficial "(Cantu, 2004).

### **Handwriting**

"Writing is an especially important area of communication and fine motor development in kindergarten. At this age, kindergarten students develop an increased desire to communicate effectively "(Copple & Bredekamp, 2009). "Writing is an integral component of language, and when a student writes, thoughts and knowledge are synthesised to create a unique message. "It is at this time of development when kindergarten students begin to understand that their personal thoughts and experiences can be expressed in written form." (Jones, Reutzel, & Fargo, 2010).

"In order to promote reading, it is vital that writing is also given appropriate attention in school; as reading and fine motor skills progress, kindergarten students typically move forward in their writing skills." Engaging kindergarten students in writing helps kindergarten students increasingly become better readers "(Copple & Bredekamp, 2009).

Stewart, Rule, & Giordano (2007) reported to find out the effect of fine motor skill activities on kindergarten students' attention. This study explored the effect of fine motor skill activities on the development of attention in kindergarteners (n =68) in five classes at a suburban public school in the Intermountain West through a pretest/posttest experimental group (n =36) and control group (n =32) design. All children received the regular curriculum, which included typical fine motor activities such as painting, colouring, writing, and play activities with small items. The treatment was a series of supplemental fine motor activities in which children used tongs, tweezers, and spoons to move small items. The assessment was the attention subtest of the Cognitive Assessment System. A significant group's interaction with females positively responding to the treatment was found, suggesting that fine motor skill activities are effective in increasing female kindergartners' attention.

National Educational Psychological Service (2015) reported the strategies to develop fine motor skills recommendations for early primary school children. It is important for children to develop muscle control in their hands and shoulders before beginning to learn to write. This control can be developed using activities like strengthening hand grasp by using a hole-punch, making paper balls and squeezing sponges. Provide opportunities for practising timed grasp and release with tools other than scissors. Try using tweezers or tongs to sort cotton balls, blocks, play dough, or balls. For the development of the child's web-space (the circle

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that forms with the index finger and thumb), that is needed to hold a pencil correctly: 'pop' the plastic 'bubbles' on packing sheets, open and close zip-locked bags; snap snaps; wind up windup toys that have a knob, use an eye-dropper to make pictures by mixing food colouring with water and dripping it on to paper towels; Tug of war – using hoops, children work in pairs to pull each other across a line. Children can help to develop number and pattern concepts like cutting. Start without the need for precision; try cutting pieces of straws, grass, strips of paper or rolls of play dough. When scissors action has developed, move on to cutting out basic shapes. Using drawing between parallel lines- this can be introduced at an appropriate level for the child in question and gradually made more difficult, e.g. by moving a toy car (or a finger) between lines on the floor, moving chalk (or a finger) between lines on a blackboard, moving a finger between lines on a sheet of paper. The distances between the lines can gradually be reduced. Check that the child is holding the pencil correctly, that the paper is kept still, and that s/he always goes from left to right. Start by using straight lines, then make it more difficult by introducing angles and later curves. Joining dots- place dots further apart to make this more difficult. Tracing activities can be done with the finger first, then with a crayon, and then with a pencil. Shape exercises to start by getting the child to continue the given pattern either by tracing or by joining the dots. Copying can then be introduced. Use large coloured dots to show the child where to begin the letter and indicate direction with arrows. Sandpaper letters can help. This promotes shoulder, elbow, and wrist strength as well as the correct pencil grip. Practicing buttoning and unbuttoning, zippering, hooking fasteners or tying helps to build strength and dexterity. Large, child-appropriate practise boards that help facilitate these activities are available in most toy stores. Kids develop motor skills at different rates. But when young kids struggle with fine motor skills, they can have trouble with key tasks like grasping utensils (like pencils), moving objects with their fingertips, and using tools like scissors. They may also have difficulty learning to tie shoes. If your child's fine motor skills need a little extra help, try these fun activities.

#### **Playdough and Putty**

Play-dough and putty are often used as part of the heavy work component of a sensory diet. They can also help improve a child's fine motor skills. Encourage your child to squeeze, stretch, pinch, and roll 'snakes' or "worms" with the play clay. You can even have your child try to cut the play-dough with scissors. (Learn how to make three types of sensory-friendly slime, including putty slime.)

#### **Painting**

Different types of painting can help strengthen your child's hand-eye coordination and manual dexterity. Finger painting gives kids an opportunity to use their hands- and to get messy. Painting with a brush helps kids learn to hold a brush and gain greater control using it as a tool. (Paint-by-number kits are great for brush painting). To add a little sensory play to the mix, you can even try scratch-and-sniff painting.

#### **Playing with Sponges**

A new, clean sponge, some water, two water and two bowls are all you need for another

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activity to build fine motor skills. Fill one bowl with water and leave the other empty. Your child can soak the sponge in the water and then squeeze out the sponge into the other bowl. It's a simple game that can strengthen your hands and forearms. If you cut off a cube of the sponge and have a small chalkboard and some chalk, you can also do a "Wet-Dry-Try" multisensory handwriting activity. Buttoning a shirt, latching a zipper, and holding a pen are basic fine motor skills we often execute without thinking. These are learned skills that come only with countless practise sessions. However, by the time students reach kindergarten, they are expected to have developed a mastery of several fine motor skills.

#### **Grip**

Most children should be resting their elbows on the table and using their hand muscles to perform the movements that lead to letter writing by the age of four. Shorter pencils and crayons are easier for their little hands to manipulate. Further Practice: FLIP Crayons are the perfect size for encouraging proper grip skills that will seamlessly translate to larger pencils and pens when children are ready.

#### **Letter Formation**

Learning how to correctly write your ABCs isn't just important to participate in the classroom, it can lead to better grades. Research published in the Journal of Early Childhood Education and Development has shown a positive correlation between better handwriting skills and increased academic performance in reading and writing. Further Practice: Get a proven way to learn pre-writing skills, and letter and number formations in My First Book Set. Extra Credit: The Wet-Dry-Try app for iPad brings handwriting lessons to life, helping reinforce letter and number formations with fun games and activities.

#### **Use of Scissors**

Being able to successfully manipulate scissors is a fantastic test for children's fine motor abilities. It's also not something that comes easy for all students, particularly if they lack the necessary hand muscle strength. But that's what practice is for! Further Practice: Give your students a hand workout by printing and cutting out these Mat Man birthday cutouts, which your students can then decorate and personalize with their choice of colors. Extra Credit: Build intrinsic hand muscle strength and coordination with activities that incorporate tongs. Let them move assorted tiny objects from one container to the other. You may find yourself getting pulled into this fun activity. Whew—that's a lot of skill-building! Not sure where to begin? Get suggestions for practicing all of these skills and more with our free fine motor and letter practice worksheet. Our extensive blog is also filled with excellent lesson ideas you can easily incorporate into your classroom.

#### **Hypotheses**

**Ho<sub>1</sub>:** There is no significance difference between the effect of fine motor skills activities on writing of low achievers of both experimental and control group in post-test.

**Ho<sub>2</sub>:** There is no significance difference between the effect of fine motor skills activities on writing of high achievers of both experimental and control group in post-test.

**Ho<sub>3</sub>:** There is no significance difference between the effect of fine motor skills activities on writing of low achievers students and high achievers students of both experimental and control group in post-test.

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## **Material and Methods**

### **Population**

The population of the study comprised of all kindergarten students from 386 Girls Primary Schools of District Nowshera, Khyber Pakhtunkhwa, Pakistan, aged 4 to 6 years (Class KG).

### **Sample**

A sample of 40 kindergarten students were selected from Government Girls Primary School Pabbi District Nowshera Khyber Pakhtunkhwa having age group 4 to 6 years.

### **Research Instrument**

For the construction of valid and reliable teacher made test the researcher studied the first two units from English text book of Kindergarten class. Pre-test and post-test were constructed by the researcher. Pre-test consisted of 50 MCQs, selected from the first two chapters of the English Book of Kindergarten class. The post-test also included fifty items, selected from the same two chapters of the Kindergarten class in the subject of English. Posttest was comprised of 3 sections A, B, and C. Section A had 20 MCQ, items. Section B comprised of 15 items to match the columns and section C had 15 True/False items.

### **Procedure**

Before starting the treatment, the 40 students were divided in control and experimental groups on the basis of their pre-test scores through pair random sampling technique. The pre-test scores were converted into descending order. The first pair of the students was divided into control and experimental groups. Similarly, second pair was divided into control and experimental groups. Both experimental groups and control group had 20 students. The researcher started her treatment with the help of two primary school teacher of Govt. Primary School No.2, Pabbi, and District Nowshera. The control group was treated through lecture demonstration method while experimental group was treated with activity based method. At the first work of the treatment the experimental group students were given the activities of cutting and pasting. The activities of cutting and pasting were undertaken for the first three days of the experiment. In last three days of the first week the students were given the activity of play dough. The students were asked to make different shapes and models of their own choice. In second week the students were given the activities about 'shoes laces' and 'sand tray' wheat tray' activities. Students were asked to buckle and unbuckle their shoes. Moreover, the students were asked to use 'sand tray' for writing their names, lining the sand to make shapes of their own choices.

In third week the students were given activities of 'button, pasting and sunflowers cutting and pasting'. Students were also given 'tong activities'. The students were given the activities to make flowers. In fourth week 'snow man and packing material activities' were given to the students. 'Pressing of toys activities' were also given to the students in this week. In fifth week 'Zip and ribbon activities' were given to students. Girls' students were given the activities to shape different hair styles. In sixth week 'tracing and coloring the alphabets' and 'different shapes activities' were given to the students. The control group was treated through lecture demonstration method. At the end of sixth week, the students of both control and experimental groups were given posttest.



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**Analysis of Data**

The data for the study was collected through pre-test, post-test. It was interpreted and analyzed by formula of standard deviation, mean, t-test and ANOVA.

**Results and Discussion**

**Ho<sub>1</sub>:** There is no significance difference between the effect of fine motor skills activities on writing of low achievers of both experimental and control group in post-test.

**Table 1.** Significance of mean difference between low achiever students of the two groups on post-test

Group	N	Mean	SD	t value	p value
Experimental	11	32.10	5.347	2.199	0.050
Control	11	23.10	5.117		

df = 9

Non-significant at 0.05 level

Table 1 shows that low achievers students calculated value (t=2.199) was greater than the table value (2.073) and calculated p value (p=0.050) was less than significance p value at 0.05 level. In post-test the mean value of achievement score regarding low achiever students of experimental group was 32.10 while mean value of achievement score of control group was 23.10. It shows that there was significance difference between the mean scores of experimental and control group regarding low achiever students. Thus, the null hypothesis was rejected. For developing fine motor skills in kindergarten students the experimental group showed better performance as compared to control group in post-test.

**Ho<sub>2</sub>:** There is no significance difference between the effect of fine motor skills activities on writing of high achievers of both experimental and control group in post-test.

**Table 2.** Significance of mean difference between high achiever students of the two groups on post-test

Group	N	Mean	SD	t value	p value
Experimental	10	32.94	5.617	2.890	0.020
Control	9	28.84	6.792		

df = 9

Significant at 0.05 level

Table 2 reveals that high achievers students calculated value (t=2.890) was greater than the table value (2.073) and calculated p value (p=0.02) was less than significance p value at 0.05 level. In post-test the mean value of achievement score regarding high achiever students of experimental group was 32.94 while mean value of achievement score of control group was 28.84. It shows that there was significance difference between the mean scores of experimental and control group regarding high achiever students. Thus, the null hypothesis was rejected. For developing fine motor skills in kindergarten students the experimental group showed better performance as compared to control group in post-test.

**Ho<sub>3</sub>:** There is no significance difference between the effect of fine motor skills activities on writing of low achievers students and high achievers students of both experimental and control group in post-test.

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**Table 3.** Mean scores, standard deviation and grand mean of low achiever students and high achievers students in control and experimental groups on post-test

Group	Students	N	Mean	SD	Grand mean
Experimental	High achievers	11	76.77	5.82	60.53
	Low achievers	9	60.83	5.33	
Control	High achievers	11	61.00	5.95	
	Low achievers	9	43.44	5.10	

Table 3 reveals that mean value of high achievers students (76.77) was greater than low achievers students (60.83) of experimental group in post-test while mean value of high achievers (61.00) was greater than the low achievers (43.44) of control group in post-test. In post-test the mean value of achievement score regarding high achiever students of experimental group was greater than the high achievers of control group. It shows that there was significance difference between the mean scores of experimental and control group regarding high achiever students. For developing fine motor skills in kindergarten students the experimental group showed better performance as compared to control group in post-test.

### Conclusions

There was no significant difference between the mean scores of experimental and control group in post-test. It showed that the performance of both the groups were different after the treatment. There was significant difference between the performance of high achievers and low achievers of both experimental and control group in post-test.

There was significant difference between the mean scores of experimental and control group in retention test. It showed that the performance of both the groups was different and experimental group retain their knowledge while control group cannot retain their knowledge. There was significant difference between the performance of high achievers and low achievers of both experimental and control group in post-test.

### Recommendations

- Teachers, other supportive staff, school heads, school units, policy makers and parents should understand these foundations for early handwriting, i.e. ability to write by grasping/mastering primary skills like holding and manipulating pencil with good coordination; 'visual motor' like 'copying shapes, letters, or symbols'.
- Handwriting instructions should be effectively treated or considered. Because writing both depend on important 'literacy concepts' without which no effective and efficient instruction is possible.
- Since handwriting instruction and activities are very important, so instruction in handwriting should be guided and clear.
- Like teachers and parents, the professional 'therapists' should also should understand proficiently the 'literacy skills such as phonological awareness, phonemic awareness, and alphabetic principle in addition to fine motor and visual motor skills'. Like them, the other occupational experts concerned should have the competence of teaching and remediating these basic mechanisms of handwriting'.



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- Complementary exercises on letter formation should be provided so kindergarten students become able to write alphabet.
- The procedures of the 'Initial abilities' and the 'Test of In-Hand Manipulation' should be practiced on the kindergarteners for wide range performance and results.
- Proper guidelines and directions should be formally endorsed to the students and their teachers for correct handwriting during classroom learning.

#### **Recommendations for Future Research**

Since, very few research studies standing out on the handwriting skills, of which fewer investigations are about kindergarten students, so the coming modern studies should focus on the ignored areas of writing capabilities of the kindergarteners in Pakistan specifically. The new researchers should work on new acceptable models by utilizing the modern available techniques and measures for improving performance and ability of the kid learners. There is a dire need of research to study the problems faced by the kindergartners in their pre-schooling, nursery and while-schooling periods. Additional experimental studies should be conducted to understand deeply the correlation between 'handwriting and reading measures' at kindergarten level.

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