

## Ability Grouping and Its Effect on Students' Performance in Science at Primary Level

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### Abstract

*The aim of the study is to see the impact of ability grouping on science performance of the students at primary level. The variables included in this research are classroom setting both homogeneous and heterogeneous, (independent variable) and science performance (dependent variable). Population of the study included 5<sup>th</sup> grade students of Federal Government Schools in Rawalpindi (Pakistan). The sample is the 5<sup>th</sup> grade students and sample size is 48 students. The design of the study is experimental. Before teaching pre-test is conducted to check the pre-requisite knowledge of the students included in both groups and then both groups are taught in different types of classroom settings. Experimental group is taught in homogeneously grouped classes and they are divided in three groups, high achievers, average students and low achievers, and all these groups are instructed in three different classes and control group is taught in mixed ability setup. After teaching the module States of Matter, post-test is applied to assess the difference in the performance of both groups. From the overall results, it is clear that students in experimental group have performed better as compared to the students in control group. Therefore, it has been proved that ability grouping has a positive effect on student's science performance at primary level.*

### INTRODUCTION

Individual differences are apparent in practically all fields of life. These can be in educational achievement, intelligence, emotional and social adjustment etc. It is necessary that in the classroom, teacher should provide suitable conditions to deal with these differences; otherwise, these differences can hinder the achievement of many

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students. According to (Huitt, 1997), there are three different approaches for dealing with individual differences among students. First, you can develop events of instruction that consider them as part of the instructional process. The second approach is to provide some sort of grouping, in order to reduce or accommodate for the variability with respect to student background, achievement, ability or some other characteristic. Leveling or tracking, classroom grouping, cooperative learning, and individualized instruction are examples of this approach. Third, you can modify the conditions within which instruction is taking place.

### **IMPORTANCE OF ABILITY GROUPING**

Grouping by ability is very important as far as educational provision is concerned because it is an important step for making our education system more systematic and it will help for placing students in a central position in the whole process of learning. This type of grouping has very deep and healthy effects on the students, also. In the ability grouped classrooms, students will experience more success in their academic field as well as in their confidence and overall class performance. When a student is placed in the situation where everyone is like him, he will have no inferiority complex, he/she will know that he can improve his performance, and can get good grades, he/she will know that I have to work hard for even a single class test if I want to excel in the class.

Ability grouped classes are more likely to provide environment which will prove helpful for student's social, intellectual, emotional and moral development. It increases student achievement by reducing the disparity in student's ability levels, and this increases the likelihood that teachers can adjust instruction that is neither too easy nor too hard for most students. The assumption is that ability grouping allows the teacher to increase the pace and raise the level of instruction for high achievers, and to provide more individual attention, and repetition for low achievers. The high achievers benefit from having to

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compete with one another, and the low achievers benefit from not having to compete with their more able peers.

On average, gifted students for whom ability grouping is paired with enrichment activities outperform equally gifted students in mixed-ability classes by 4 to 5 months in a year. Through the course of a school year, "ability grouping alone produces in gifted students an academic increase of about one month over mixed-ability classes." (Swiatek, 1997)

It is crystal clear that heterogeneous classes require instructional and organizational innovations to accommodate a wide range of learners. Such approaches include cooperative learning groups, peer tutors, flexible grouping practices, team teaching, multi-age groupings, and instruction in higher.

### **RESEARCH HYPOTHESIS**

“Homogeneously grouped class has positive effect on student’s science performance as compared to heterogeneously grouped class”

### **NULL HYPOTHESIS**

“Homogeneous ability grouping has no effect on student’s performance in Science subject”

### **METHODOLOGY**

The research was conducted to study the effect of homogeneous ability grouping on student’s science performance.

### **OBJECTIVES OF THE STUDY**

The objectives of the study were:

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1. To analyze the effects of homogeneous ability grouping on students,
2. To identify the best classroom setting for learner's success, and
3. To determine whether mixed ability class has any effect on learner's concept formation in Science.

## **OPERATIONAL DEFINITION**

The class setting was of two types. Homogeneously grouped class, and heterogeneously grouped class.

### *Homogeneously grouped class*

Homogeneous grouped class was the class in which students of similar ability were grouped together and instructed. In this type of class, all the students were either high achievers, average students or low achievers. The researcher instructed these three groups separately.

### *Heterogeneously grouped class*

Heterogeneously grouped class was comprised of mixed ability students. This class included all the students, high achievers, average performers and low achievers.

## **PARTICIPANTS OF THE STUDY**

The population of the study included primary level students and more specifically fifth class of all the schools. The sample was students of fifth class at Government School of Pakistan. Size of the sample was 48 students. The sampling was non-probability and was selected through purposive sampling technique. For the study, experimental research design was adopted. Two groups control and experimental treatment groups were made.

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In addition, one variable i.e. class setting was manipulated to see the effect on the other variable 'Science performance'.

The study was quantitative one, as it required the scores in numerical form for interpretation and comparison. Moreover, it was deductive in its nature. The present research was conducted in the classroom setting, as it was an experimental study. In the control group, nothing was changed from the usual routine, but for the experimental group, when three groups were made, they were taught in the separate classrooms. Pre and posttests were the instruments to check the difference in different group setting, which was the purpose of the study. As the study was experimental in nature, so researcher made tests were used to study the effects of homogeneous and heterogeneous class setting on student's science performance.

From the total of 48 students, 24 were randomly assigned to one section and other 24 were assigned to the other. These two sections were balanced, in almost all the aspects, like, all the students were of approximately at the same age level, the ratio and level of high achievers, average and slow learners was approximately same in both these sections, all the students had same socio-economic status, their religious background was same, so in short both of these sections have not much variations between them.

The procedure for grouping students was the judgment made by the researcher based on:

- i. Teacher's opinion, and
- ii. Previous Science result.

Then finally the comparison was made between the scores of pre-test and post-test of two groups' one in heterogeneous setting and other is homogeneous setting of classrooms, to examine that in which settings learners were more successful or does grouping students by ability has any effect on their performance.

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**FINDINGS IN TABULAR FORM****Table: 1** Pre and post test marks of high achieving students in experimental group

S. no of students	Pre-test Marks Out of 30	Post test marks out of 30
1.	26	28
2.	22	20
3.	20	18
4.	19	24
5.	19	22
6.	19	15
7.	18	20
8.	18	18
<b>Total Marks.</b>	<b>161</b>	<b>165</b>

This table shows the scores of pre and posttests of high achieving students in experimental group. From the total of the scores, it is clear that although high achievers gained some marks more in posttest as compared to their pre-test, but there is not so significant achievement in their posttest results.

**Table :2** Pre and post test marks of average students in experimental group.

S. no of students	Pre-test Marks Out of 30	Post test marks out of 30
1.	17	20
2.	16	22
3.	14	18
4.	14	20
5.	12	18
6.	16	16
7.	12	18
8.	16	10
<b>Total Marks.</b>	<b>117</b>	<b>142</b>

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The table shows pre and posttest scores of average students in experimental group. From the both scores it is clear that there is significant increase of 25 marks in the posttest of students as compared to their pre-test. Therefore, from this we can say that ability grouping is more beneficial for the average students as compared to the high achievers.

**Table :3** Pre and post test marks of low achieving students in experimental group

S. no of students	Pre-test Marks Out of 30	Post test marks out of 30
1.	10	20
2.	10	22
3.	10	14
4.	7	8
5.	7	12
6.	7	14
7.	7	12
8.	5	10
<b>Total Marks.</b>	<b>63</b>	<b>112</b>

The above shows the pre and posttest marks of low achieving students in experimental group. From the total score of the two tests we can see a significant difference in the posttest of students. In the posttest, low achieving students showed 49 marks increase as compared to their pre-test. Therefore, from this result we can say that homogeneous ability grouping is most beneficial for low achievers as compare to the other groups of student's i.e. high achievers and average students.

**Table :4** Pre and post test marks of high achieving students in control group.

S. no of students	Pre-test Marks Out of 30	Post test marks out of 30
1.	24	26
2.	22	26
3.	22	18
4.	19	18
5.	19	22

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6.	19	18
7.	19	24
8.	17	20
9.	17	16
10.	15	12
11.	15	18
12.	12	14
13.	12	8
14.	12	12
15.	12	10
16.	12	16
17.	10	12
18.	10	8
19.	10	10
20.	10	8
21.	7	8
22.	7	10
23.	5	8
24.	5	8
<b>Total Marks.</b>	<b>332</b>	<b>350</b>

The table shown above presents the pre and posttest marks of students in control group. Although there is an increase in the score of posttest but this difference is only of 18 marks. Therefore, it is now clear that in the mixed ability section students showed little increase in their achievement in the form of scores.

**Table: 5** Statistical analysis of the scores of control and experimental group.

Groups	N	Pre-test Mean	Post-test Mean.	St. Deviation.	Mean difference	degree of freedom (df)	t-value	p-value
Experimental	24	14.2	17.45	4.85	2.875	46	1.825	0.129

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Group.								
Control Group	24	13.83	14.58	5.99				

From the above table it is clear the mean of pre test of experimental group is 14.2 and post test is 17.45 so the difference in mean score is 3.25, and on the other hand the pre test mean score of control group is 13.83 and post test mean of control group is 14.58, the difference in the mean score is 0.75, so net mean difference is 2.875. However, it is clear the experimental group mean difference is greater than control group mean difference of pre and posttests.

In the same way, the standard deviation is less in the case of experimental group (4.58) as compared to control group (5.99). From the statistical analysis, the value of  $t$  was interpreted against the level of significance, where the significance level is 0.129 and the value of  $t$  is 1.825. As the value of  $t$  is greater than  $p$  value, with 46 degree of freedom, so null hypothesis is not supported and research hypothesis is supported that is ability grouping has a positive effect on students Science performance. As from the net results, it is clear that students in experimental group have performed better than students in the control group.

However, from the detailed results it is clear that low achievers in the experimental group showed the increase in scores of posttest, more than any other group. Secondly, average students have performed better in the posttest and high achievers group has not showed any significant difference in the score rise in the posttest.

## CONCLUSIONS

From this study, it can be concluded that students in the homogeneous class performed better in the Science subject, as compared to the students in the heterogeneous classroom.

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So in this way our hypothesis has been proved. The reason for student's success was dependent only on the class setting, that was all the students of similar ability were grouped together and then they were taught in separate sections, while the other students were taught in the control group or in the mixed ability classroom. Content and instruction were same for both types of groups. Pre and posttest were used to evaluate the performance of students. In the homogeneous section slow learners performance was greatly improved in the post test, then average students performance and there was a slight difference in the performance of high achievers in post test as compared to their pre test.

### **RECOMMENDATIONS**

Although current research has proved that ability grouped has positive effects on student's science performance, but to avoid the negative effects of homogeneous ability grouping, the researcher suggests:

- Grouping should be based on students' attainment in the particular subject and not other factors, such as behavior.
- Learners should be frequently assessed followed by movement to different groups.
- High expectations should be held for all the groups of students, not low for low achieving students and high for high achieving students. It will harm the child intellectual development and will create hindrance in students learning.
- Teachers should display the attitude that they value all the students as students, irrespective of their ability to learn and irrespective of the group to which they belong.
- Assignments should be according to the each group's abilities.
- Movements between groups should be done, so that students in low ability group should have the hope that they can move to the high achieving group if they work hard.

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- Labeling should be avoided, instead of naming groups as high achievers, average and low achievers, name them in a different way, so that even low achievers feel proud of their group's name.

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